SMITHSONIAN INSTITUTION
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BULLETIN 96

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EARLY PUEBLO RUINS IN THE PIEDRA DISTRICT SOUTHWESTERN COLORADO

By FRANK H. H. ROBERTS, Jr.

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FRANK H. H. ROBERTS, Jr.

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1930

For sale by the Superintendent of Documents, Washington, D. C. - - - - Price 75 cents

LETTER OF TRANSMITTAL

Smithsonian Institution,
Bureau of American Ethnology,
Washington, D. C., September 16, 1929.

Sir: I have the honor to transmit the accompanying manuscript, entitled "Early Pueblo Ruins in the Piedra District, Southwestern Colorado," by Frank H. H. Roberts, jr., and to recommend its publication as a bulletin of the Bureau of American Ethnology.

Very respectfully yours,

M. W. Stirling,
Chief.

Dr. Charles G. Abbot,
Secretary of the Smithsonian Institution.

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EARLY PUEBLO RUINS IN THE PIEDRA DISTRICT, SOUTHWESTERN COLORADO

By Frank H. H. Roberts, Jr.

FOREWORD

The archeological field work which furnished the data for the following report was conducted in southwestern Colorado during the months of June, July, and August, 1928. The various village sites and burial mounds investigated were located on private land and the writer wishes to express his gratitude for the kindness shown him by Mr. Joe Melrose, of Arboles, Colo., in obtaining permission for excavations on the property of his brother, Mr. Jim Melrose; and to Max Watts, Roy Watts, George Watts, and Ultima Baker, Ute Indians, who sanctioned, with the approval of Supt. W. F. Dickens, of the Ignacio Agency, work in the ruins lying on the quarter sections which had been allotted to them. Opportunity is also taken to thank Mr. W. E. Clark, of Arboles, for many courtesies extended during the summer and for his helpful assistance in obtaining equipment and laborers during the progress of the work.

While the broad outlines of the story of the development of sedentary cultures in the Southwest are well known to the student and specialist in the field, the general reader and layman are not so well acquainted with them. For this reason it has been deemed advisable to include in the introduction which follows a brief summary and review of the history of the area as it has been retrieved through archeological investigations. The present classification of peoples and cultural horizons is so recent an archeological development that the writer feels a repetition of them necessary to a proper understanding of the background into which the villages discussed in this report must be fitted.

INTRODUCTION

The territory comprising the North American archeological field of the Southwest is encompassed in the present-day political boundaries of the States of Arizona, New Mexico, southwestern Colorado, almost all of Utah, eastern Nevada, the extreme western part of

Texas, and the great inland basin of northern Chihuahua in old Mexico. In the north it is, for the most part, a high, arid plateau country traversed by mountain ranges, scarred by sheer-walled canyons, and dotted by towering, flat-topped mesas whose steep sides rise abruptly out of the great barren stretches which are so characteristic of the region. To the south and west there is a gradual sloping away of the land toward the low-lying, semidesert regions of southern Arizona and New Mexico.

Prominent in the topographical features are the drainage systems of the San Juan, Little Colorado, Rio Grande, and Gila-Salt Rivers. The four major archeological subareas of the field as a whole are grouped around and take their names from them. Minor subareas border the smaller streams which also, in many cases, furnish the designation for the particular cultures whose remains are found along their courses. Hence the San Juan, Little Colorado, Mimbres, and other areas to which reference so frequently is made.

The region as a whole saw a nomadic Indian people, who in the beginning were to a large degree dependent upon the hunt and the chance gathering of wild seeds and fruits for their livelihood, develop first, through the course of centuries, into a semihunting, semiagricultural group and, finally, into one mainly sedentary in its characteristics which drew its sustenance largely from the products of the field. It witnessed, also, the gradual replacement of these people by a migrant group, one which took over and brought to their ultimate development the corn-growing, house-building, and pottery-making industries of the older inhabitants, as well as introducing factors of its own. The region likewise saw this group attain its cultural peak and a decline set in, a decadence which was further hastened and augmented by the arrival of the white man in the persons of the early Spanish explorers.

Archeological studies have shown that this culture growth passed through a number of stages in its development. The several horizons are classified under two main headings, called the Basket Maker and the Pueblo. The former, comprising the old original group, has three divisions, the latter five.[1]

The Basket-Maker Periods

There are certain outstanding characteristics which may be considered as typical of the Basket-Maker phase. These are: A long-headed people who did not practice cranial deformation; who made excellent coiled basketry, twined woven bags, and sandals; who used the spear thrower or atlatl, and curved clubs; who depended on fur cloth robes for body covering during the months when the bleak mesa tops were swept by chill winds and occasional storms. Ordinarily their clothing was limited to a short, apron-like cord skirt for the women and a "gee-string" for the men, and sandals for the feet.

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[1] Kidder, A. V., 1927, p. 490.

The earliest Basket Maker dwellings seem to have been of a highly perishable nature and thus far no traces of them have been found. Perhaps during their early nomadic stage they placed chief reliance on caves and other natural shelter for protection against the elements. It was the adoption of agriculture, derived from the Mexican area to the south, which provided the foundation upon which the entire structure of the ensuing culture rested. The corn-growing industry through its inherent nature tended to impose upon the people a more sedentary existence, although at first it probably did not have a marked effect on their mode of life.

As time went on and better methods of cultivation brought larger harvests, storage places for the grain became essential. Small pits were dug in the floors of caves. These pits were lined with large stone slabs and covered over with a pole, brush, and plaster superstructure. Thus the first efforts at construction of which we have definite knowledge were devoted to the development of substantial and serviceable granaries. The storage bins were often put to a secondary use for burial purposes, and it is from these graves that the knowledge of the people's arts and industries has come down to us through the objects which they interred with their dead.

Eventually, no doubt as a result of constant improvements in the methods of granary construction, it was discovered that by enlarging the pits and heightening the brush superstructure a fairly good dwelling of the pit type could be built. Following this development the transition to village life was attained and truly sedentary cultures became a fact.

At about the time when house-building experiments were under way the beginning of a new industry, pottery making, appeared. The latter was possibly due to another introduction from the south, but, at most, it was only the idea which was brought in, for the entire ceramic development was unquestionably local.[2] The first, crude clay containers, fashioned in basketry molds, were not true pottery; they were not fired but simply sun dried. Ultimately, no doubt through accident, it was learned that the secret of making useful clay vessels lay in firing them, and from that time on ceramics assumed a major rôle in the material culture of the Southwest.

Late in the period, just prior to the arrival of the first Pueblo peoples, the bow and arrow began to replace the spear thrower, several varieties of corn were grown where previously there had been but one, beans appeared in the list of agricultural produce, and an occasional feather-cloth robe was made.

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[2] Morris, E. H., 1927, pp. 138–152, 198.

The nomadic period of the Basket Makers, which at the present time is largely postulated from evidence secured at two widely separated sites, is known as Basket Maker I. The introduction of corn, the development of storage bins in the caves of the region, and the beginning of pottery making, through experimentation with crude unfired clay containers, are features which characterize Basket Maker II. The development of the more or less permanent house, the grouping of houses into villages, pottery making as an established industry, diversity in the products of the field, the appearance of the bow and arrow and feather cloth robes, constitute the norm of Basket Maker III.

Our present knowledge indicates that both periods II and III had a fairly wide distribution throughout the area. Basket Maker II has been found in southeastern Utah, northeastern Arizona, northern and southern New Mexico, and at one locality in southwestern Colorado. Basket Maker III remains are reported from southeastern Nevada, northeastern Arizona, northwestern New Mexico, and southwestern Colorado. As archeological work progresses they will no doubt be found in other localities.[3]

THE PUEBLO PERIODS

There is a decided contrast between the outstanding characteristics of the Pueblo periods and those of the preceding Basket Makers. A new group of people, a broad-headed strain, practicing cranial deformation, began to drift into the area. They took over, changed, and adapted to their own needs many of the material traits of the older inhabitants. Their earliest period was one of transition and instability. There unquestionably was a clash of greater or less degree between the two peoples. In some cases it was no doubt a violent one and the Basket Makers were either driven out, to locate elsewhere possibly, as some believe, to become the ancestors of the Paiute and Mohave, or else summarily killed. In other localities the meeting was probably a comparatively mild incident with a subsequent intermingling of the old and the new. In some sections, notably the extreme eastern and western borderlands of the area, possibly the southern also when the necessary information is available, the Basket Makers held on for a long time. Throughout the region of the north-central portion of the area as a whole they seem to have been almost immediately absorbed or replaced.

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[3] For a fuller and more detailed account of the Basket Maker peoples the reader is referred to Kidder (1924, 1927), from whom most of the material in the foregoing summary was taken. Additional information on more specific phases may be found in Guernsey and Kidder (1921), Morris (1927), and Roberts (1929).

Out of the stress and turmoil, however, several new features appeared and the Pueblo phase became firmly established. Cotton was introduced and fabrics made from it assumed an important place in the material culture. The wild turkey was domesticated. There was a distinct improvement in pottery making, together with the unfolding of stylistic fashions in the character of ceramic decoration. The crude one-room domiciles gave way to structures, entirely above ground, with several contiguous rooms. Horizontally laid stones in the wall masonry became a house-building feature. Thus was developed a type of dwelling which reached its culmination in the great communal structures whose ruins are scattered throughout the more central portions of the area.

The rise of the large communities was due, for the most part, to an ever-increasing tendency on the part of the people to abandon the outlying small house villages and to concentrate in certain centers rather than to a sudden and marked increase in population. Although there is no definite proof on the subject, present indications are that a constantly augmented pressure from the wilder, more nomadic Indians of the borderlands forced the Pueblos, in self-defense, to gather in populous centers.

During the earlier stages of Pueblo development the cultural features had a generalized aspect, but with the concentration of the people into more or less isolated communities a tendency toward specialization became more and more marked. This trend finally reached its climax in the crystallization of definite and characteristic forms peculiar to each of the centers. It is because of this fact that southwestern archeologists can speak of the Mesa Verde, Little Colorado, Mimbres, and Rio Grande pottery types; can associate different forms of masonry and various architectural features with particular subareas; and can identify the several forms of ceremonial structures, the kivas, with certain centers. It is this period of life in the great urban centers which so frequently is called the classic era of the Pueblo peoples.

The large centers for a time stemmed the tide of encroaching and plundering nomads, but they, too, eventually broke down and finally were abandoned. There were other factors, no doubt, which contributed to the ultimate collapse of the great villages. It seems very likely that the marauding bands were aided to some extent by internecine strife growing out of differences between various factions in the pueblos. Furthermore, the Southwest periodically experiences more or less extended droughts and it may well be that a prolonged series of crop failures so reduced the resistance of the people that they gave up the struggle and set out to find new locations where a more peaceful, less rigorous existence would be possible. The theory is frequently advanced that the abandonment of the outlying districts may be attributed wholly to a progressive and intensive desiccation of the entire region. It would seem, however, that there had been no catastrophic climatic change in the area since the days when the Pueblos attained their fullest development. Hence, such natural phenomena should be considered only in the light of a contributing factor.

At all events there was a gradual subsidence from the former cultural peak and an era of instability and migration set in. The San Juan, which had been a leader in the development of the Pueblo cultures and whose great centers had been the guardians of the northern frontier, was deserted; villages along the upper Gila were no longer occupied; and somewhat later the lower Gila and Chihuahua Basin communities were abandoned. There was an even greater drawing together of peoples toward the center of the area as a whole and a marked reduction in the boundaries of the occupied region. This stage stands out distinctly as one which saw innumerable small bands tramping hither and yon in search of a suitable place in which to begin anew.

The redistribution had become fairly fixed, a whole new series of communities had sprung up along the Rio Grande and Little Colorado Rivers, and the Pueblos seemed headed toward a renaissance when the final blow was struck by the arrival of the white man. From that day to this the story is one of a hopeless struggle against the gradual replacement of the Pueblo arts, industries, customs, and beliefs by those of the white man, and even though they realize the futility of their efforts there are still a few who cling desperately to that which is old.[4]

The first stage of the Pueblo peoples, that which saw their arrival in the Southwest and the attendant confusions and transitions, is designated as Pueblo I by the archeologists. Inasmuch as the main body of this report is to deal with investigations carried on in certain villages belonging to this period further comment will be reserved for following pages.

Pueblo II is the period of widespread geographical distribution of life in small villages, best illustrated by the so-called one-clan or "unit-type" houses discovered and first described by Dr. T. M. Prudden.[5] The work of more recent investigators has supplemented

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[4] A more complete discussion of the Pueblo periods is to be found in Kidder (1924), the basis for the preceding paragraphs.

[5] Prudden, T. M., 1903, 1914, 1918.

Prudden's data and added new information for other phases of the period.[6]

The classic period, the stage of urban centers, great developments in the arts and industries, together with a marked local specialization, is designated as Pueblo III. The outstanding architectural examples of the period are to be found in the large buildings in the Chaco Canyon, in northwestern New Mexico;[7] in the great cliff houses of the Mesa Verde in southwestern Colorado;[8] and the Marsh Pass or Kayenta district of northeastern Arizona.[9] The pottery from these centers is also typical and illustrative of the marked specialization developed during Pueblo III. The most unique vessels, from the standpoint of decoration, come from the Mimbres Valley in southwestern New Mexico.[10] The closing days of the period, when the decline of the great centers had begun, is shown best in the ruins of Kitsiel and Betatakin [11] in northeastern Arizona; the Mesa Verde period at the Aztec ruin, New Mexico;[12] and at sites comparable to that at Bandelier Bend in the Pecos Valley of the same State.[13] In a previous summary the large adobe ruins of the Casa Grande type in southern Arizona were placed in this period but their complete development belongs more properly in the following one.[14] Pueblo Grande, about 7 miles east of Phoenix, Ariz., apparently had its beginnings in late Pueblo III.[15]

The period of redistribution, abandonment of the peripheral districts of the area, cultural decline, and establishment of new communities in the Rio Grande and Little Colorado regions is classed as Pueblo IV. This period should be regarded also as having two phases. The first part covers the stage of instability, migrations, and the springing up of new centers, extending down to the time just preceding the arrival of the Spaniards. The second phase was of much shorter duration and includes the interval from the appearance of the first explorers down to the complete subjugation of the Pueblo peoples after their temporarily successful revolt against the Conquistadores. Because of lack of information, due to a paucity of work in such sites, it is difficult to name ruins which are solely representative of the earlier part of the period. Those which come closest to answering the purpose are Chevlon, Homolobi, and Chaves Pass ruins on the upper Little Colorado.[16] There are, however, numerous examples which had their beginnings rather early in IV and continued on to practically the end of the phase. In the Galisteo Basin in New Mexico are three which seem unquestionably to belong in that category. They are Colorado, Shé, and Blanco.[17] Farther north, in the Pecos district, were the pueblo of Rowe[18] and the old north terrace of Pecos itself.[19] In the Hopi country of Arizona there are many of the Jeddito Valley sites which date from that time.

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[6] Fewkes, J. W., 1923 a, pp. 102–105; Martin, P. S., 1929.

[7] Hewett, E. L., 1921, 1922; Judd, N. M., 1922, 1923, 1924, 1925, 1926, 1927; Pepper, G. H., 1920.

[8] Fewkes, J. W., 1909, 1911 b.

[9] Fewkes, J. W., 1911 a; Kidder, A. V., 1924, pp. 72–73.

[10] Fewkes, J. W., 1914, 1916, 1923 b.

[11] Fewkes, J. W., 1911 a; Kidder, A. V., 1924, pp. 68–72.

[12] Morris, E. H., 1919 a, 1921, 1924, 1928.

[13] Kidder, A. V., 1924, p. 87.

[14] Roberts, F. H. H., jr., 1929, p. 5.

[15] Schmidt, E. F., 1927, 1928.

The later stages of the first phase are well represented. On the Rio Grande were the Pajaritan centers of Puyé and Tyuonyí.[20] The great pueblo at Pecos[21] was in full stride and in the Hopi region Sikyatki[22] was in its heyday. Farther south and west were the Casa Grande villages.[23] The latter are somewhat of a puzzle, however, as they are puebloan in pottery forms only. The other features of the culture are quite distinct.

The second part of the fourth period is the early historic. It is best represented by Awatobi in the Hopi district;[24] Hawikuh, near the present village of Zuñi, N. Mex.;[25] Pecos,[26] San Cristobal, and San Lazaro[27] of the Rio Grande region. There is, of course, a certain overlapping. All of the examples cited were thriving villages before the Spaniards arrived and Pecos continued to be occupied down to 1838, but for general purposes they fall into the suggested grouping. Hawikuh was abandoned in 1670, Awatobi was destroyed in the autumn of 1700, and San Cristobal and San Lazaro were apparently deserted at about the same time.

The fifth and last period in the Pueblo chronology is that of the modern villages. Examples of this group are better known to the general public than are those of the preceding periods. Along the Rio Grande are Taos, Santa Clara, San Ildefonso, Tesuque, and Isleta, to mention but a few. Farther west is Acoma, which has an unbroken history extending from the earliest Spanish days; still farther west the Zuñi towns, and in Arizona the various Hopi villages.

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[16] Fewkes, J. W., 1904.

[17] Nelson, N. C., 1914, pp. 74–93; 1916, p. 179.

[18] Guthe, C. E., 1917.

[19] Kidder, A. V., 1924, p. 86.

[20] Hewett, E. L., 1909 a, b.

[21] Kidder, A. V., 1924.

[22] Fewkes, J. W., 1898, pp. 631–742.

[23] Fewkes, J. W., 1912, pp. 33–179.

[24] Fewkes, J. W., 1898, pp. 529–631.

[25] Hodge, F. W., 1918 a, b.

[26] Kidder, A. V., 1924.

[27] Nelson, N. C., 1914, 1916.

Relative Age and Dates of Periods

Among the questions always asked by those who are interested in archeological work in the Southwest are several which have an important bearing on the problem as a whole. These are: On what grounds can it be stated that the Basket Makers were older than the Pueblos and how is it known that any given cultural horizon is subsequent or antecedent to another? What are the dates of the periods in the chronology? The first can be answered through the results obtained by a study of stratigraphy, the second partially by historical documents and partially by correlation with datable sites. A much more accurate method for both relative and actual dating is being developed by Dr. A. E. Douglass in his study of growth rings in timbers and the respective ages of the beams used in the construction of the houses. It is hoped that these will soon give definite and precise results.

The study of stratigraphy deals with the order and relative position of the various cultural horizons and gives to the archeologist a firm basis upon which to erect his conclusions. When the ruin of one type of house is found to rest upon the mound formed by the débris of another there can be no question but that the upper one is the more recent. This feature has been found to exist in the association of Basket Maker and Pueblo structures at so many different places that the priority of the former can no longer be questioned.[28] Similar conditions have been observed in the relationship between various Pueblo horizons. Remains of Pueblo I houses were found 10 feet beneath the foundations of Pueblo Bonito [29] and other Chaco Canyon sites have shown Pueblo II ruins overlying those of a Pueblo I dwelling.

Where an actual superposition of buildings does not exist there are other ways of establishing a relative chronology. For example, study of Pueblo II sites has shown that certain characteristic types of pottery are to be identified with that cultural horizon. The same thing is true of other periods. It is at this point that the stratigraphic evidence found in the refuse mounds at the larger sites comes to the aid of the archeologist. In the material comprising such a mound, provided it has not been disturbed, the oldest potsherds are found at the bottom and the most recent at the top. On the basis of such data the cultural sequence has been clearly shown at several sites and the period order already outlined very definitely established.[30]

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[28] Cummings, B. S., 1915, p. 274; Guernsey and Kidder, 1921, pp. 3, 114–115; Morris, E. H., 1925, p. 272; Roberts, F. H. H. jr., 1929, p. 71.

[29] Judd, N. M., 1926 a, p. 82.

[30] Judd, N. M., 1927, p. 168; Kidder, A. V., 1924, pp. 18–20; Kidder, M. A. and A. V., 1917, pp. 340–353; Nelson, N. C., 1916.

Potsherds have additional value in that they also show the relative age of different centers. Mesa Verde pottery of the great Cliff House period found in the large ruins of the Chaco and pieces from the latter center found in Proto-Kayenta sites show not only trade relations but a certain contemporaneity existing between them.

There is another factor which is of importance in the study of chronology; it is in fact one of the most fundamental principles in archeological investigation. Briefly stated it is this: When sites of a different cultural stage are found in the same region and objects from A are found in ruins belonging to B but never vice versa, the first may properly be considered as the older.[31]

When it comes to giving definite dates for the various stages of the cultural history of the Southwest the problem is more difficult. Where the site involved falls within the final phase of IV or is one of the V group it is a comparatively easy matter to give a rather accurate date because there are the actual historical records to refer to, but from the date of the arrival of the Spaniards back into the older horizons the problem becomes quite different. No longer is there documentary evidence to give the desired information. It is at this point that the correlation of objects with datable sites furnishes assistance.

In some instances trade objects from Mexico have been found in the Pueblo area. Their places of origin frequently can be quite definitely dated by means of the elaborate calendar systems which were in operation in Mexico over a considerable period of time. Consequently fragments of Toltec pottery found in a pueblo ruin, under proper conditions, would indicate that the ruin belonged to the same general period as the Toltec sites from which the vessels came. Pueblo Bonito furnishes just such evidence in potsherds collected there by George H. Pepper. These show a distinct affiliation to the pottery from the Zacatecas region which belongs to the great period of Toltec development, a period which ranged from 1000 to 1200 A. D.[32] Their position in the Bonito scale is somewhat uncertain but every indication is that they were found under conditions and in association with objects which would place them at the very end of the Bonito epoch.

Archeological evidence of trade between the Pueblo and Mexican areas is not surprising because early historical accounts record such relations. One of the first Spanish visitors to the region mentions that on his journey northward from Mexico City he met a party which was returning to Mexico after having visited the pueblo villages to trade for turquoise.[33]

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[31] Guernsey and Kidder, 1921, p. 115, note.

[32] Tozzer, A. M., 1927, pp. 212, 219.

Doctor Douglass in making a study of climatic conditions in the Southwest as expressed in the growth rings of trees developed a method whereby he could tell whether the trees from which logs had been cut were growing at the same time or to what extent their life periods overlapped. In working out this method, beginning with trees whose actual cutting date was known, he has been able to devise a definite historical chart for ring growth going back to about 1300 A. D. By comparing the rings in any given tree with the chart he is able to tell the year when the tree was cut. In an effort to carry his dates farther back into the past he turned his attention to the pine and spruce logs used for beams in the pueblo structures now in ruins. He was able to secure a great deal of material but unfortunately there is a gap between the 1300 date and the most recent beam found in ruins of the Pueblo III period. The work, however, has given a long series of relative dates covering most of the major ruins and efforts at the present time are being directed toward securing material to bridge the gap. One example is sufficient to show the value of even a series of relative dates. From the beam material secured at Pueblo Bonito and the Aztec ruin it has definitely been shown that the first Bonito logs were cut between 150 and 200 years earlier than the first ones at Aztec, establishing without question a greater antiquity for the Bonito center. When the data necessary to bridge the existing gap between the relative date series and the series extending back to 1300 has been obtained Doctor Douglass should be able to date the various ruins with a high degree of accuracy.[34]

On the basis of all of the methods briefly described in preceding paragraphs the archeologist can assign tentative dates to the various periods. This is not done with any idea of being dogmatic or of disposing of the problem for all time but solely in an effort to provide the student with a more or less definite scale by which he can view the periods in their proper perspective. With this understanding, then, it may be said that Pueblo V extends from 1700 to the present day. Pueblo IV, phase b, 1540 to 1700; phase a, 1350 to 1540. Pueblo III, phase b, when the abandonment of the San Juan was under way and the northern peoples were drifting southward, 1200 to 1350; phase a, the classic period, 900 to 1200. Inasmuch as Pueblo

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[33] Fray Marcos de Niza, whose accounts of the wealthy cities of Cibola led to the Coronado expedition and the subsequent colonization of New Mexico. (See F. W. Hodge, 1921, p. 7.)

[34] Douglass, A. E., 1921; Kidder, A. V., 1924, p. 132; Wissler, C., 1921. Since the above was written Doctor Douglass has closed the gap and published a series of dates for the more important ruins. See Douglass, A. E., 1929.

II was the period of the perfection of the stone type of house as well as other features characteristic of the later stages, and since it has been fairly well established that the farther back into a primitive culture the student goes the slower he finds the development to have been, it must have covered an interval equal to if not longer than Pueblo III. Hence, 300 to 400 years should be allowed. This would place its beginning somewhere in the sixth century. Pueblo I certainly must have been even longer in duration because it was during this stage that many changes in the older culture were made, that new features were added, and that the Basket Makers were replaced or absorbed by the Pueblos. Five hundred years has been deemed a fair estimate for the extent of Pueblo I, thus making its beginning approximately contemporary with the dawn of the Christian era. Considering what transpired during the Basket Maker stages that group must have appeared in the region from 1,000 to 1,500 years earlier.

The Northeastern San Juan Basin

It has been suggested in foregoing pages that the San Juan area, up to the end of the Pueblo III period, was one of the most important in the southwestern region. It seems to have been the center from which many of the characteristic features of the sedentary cultures were diffused and for a long time was the leader in their development. Mention has already been made of the three great centers, the Mesa Verde in southwestern Colorado, the Chaco Canyon in northwestern New Mexico, and the Kayenta district of northeastern Arizona. In addition to the three major nuclei there were a number of minor districts of more or less importance. Most of the smaller centers were peripheral to and flourished under the influence of one of the main centers, it is true, but they nevertheless have much to contribute to our knowledge of the area. (Fig. 1.)

One of the more important minor districts is that comprising the northeastern San Juan Basin in northern New Mexico and southern Colorado. In it there are two subcenters, so to speak, represented by the large group of ruins at Aztec, N. Mex., and those along the Piedra River in southern Colorado. Both places show distinct affiliations to the Chaco Canyon center, although at Aztec there was a final period during which it was under the domination of and occupied by Mesa Verde peoples. The latter feature has not been observed in the Piedra district. The Aztec and surrounding ruins have been brought to the attention of the archeologist and layman through the work of the American Museum of Natural History,[35]

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[35] Nelson, N. C., 1917; Morris, E. H., 1915, 1917, 1918, 1919a, 1924, 1928.

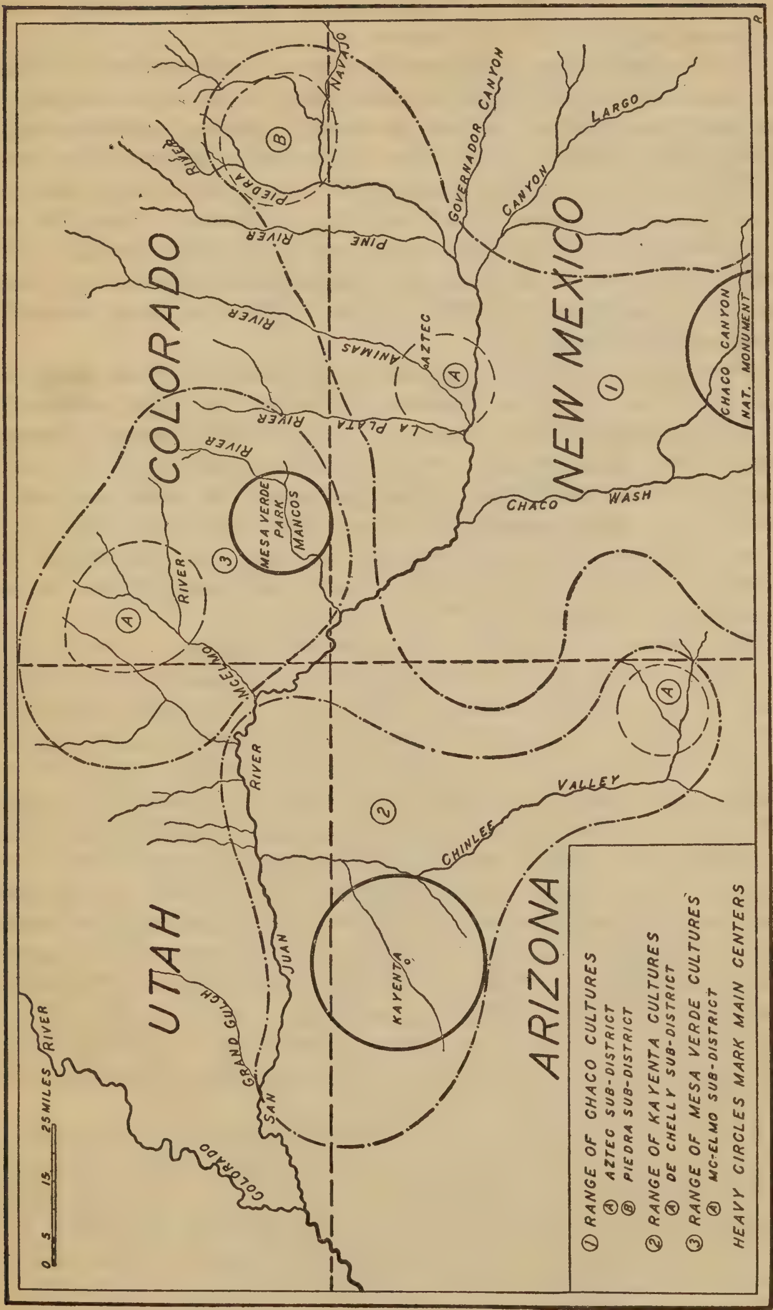
COLORADO
UTAH
ARIZONA
NEW MEXICO
PIEDRA RIVER
NAVAJO
GOVERNADOR CANYON
LARGO CANYON
PINE RIVER
ANIMAS RIVER
AZTEC
LA PLATA RIVER
MANCOS RIVER
MESA VERDE PARK
CHACO WASH
CHACO CANYON NAT. MONUMENT
MCELMO
RIVER
SAN JUAN RIVER
GRAND GULCH
COLORADO RIVER
KAYENTA
CHINLEE VALLEY
①
②
③
Ⓐ
Ⓑ
0 5 15 25 MILES
① RANGE OF CHACO CULTURES
Ⓐ AZTEC SUB-DISTRICT
Ⓑ PIEDRA SUB-DISTRICT
② RANGE OF KAYENTA CULTURES
Ⓐ DE CHELLY SUB-DISTRICT
③ RANGE OF MESA VERDE CULTURES
Ⓐ MC-ELMO SUB-DISTRICT
HEAVY CIRCLES MARK MAIN CENTERS

FIGURE 1.—General map of the San Juan archeological area

the successful outcome of which was due in large measure to the able direction of Mr. E. H. Morris.

The Piedra district, including the upper reaches of the San Juan River as far east as Pagosa Springs, Colo., is the most outlying of the two minor centers. It was practically unknown archeologically prior to the summer of 1921, when a joint investigation of the ruins of the region was begun by the State Historical and Natural History Society of Colorado and the University of Denver. From the results obtained by these two institutions during two seasons' work and later efforts on the part of the historical society alone, it was shown that a rather important section of the San Juan area still remained to be studied.

The Colorado institutions spent the greater part of the field seasons of 1921 and 1922 in excavating a portion of a large pueblo ruin on the top of the Piedra Parada or, as it is locally called, Chimney Rock Mesa. Some minor investigations were carried on in small sites located on the lower benches just above the river, and while nothing of a comprehensive nature was attempted at the latter locations, sufficient evidence was obtained to enable the director of the expeditions, Mr. J. A. Jeancon, to draw certain tentative conclusions concerning the house types.[36]

Due to a lack of funds it was impossible to continue excavations at the large ruin in the summer of 1923, and instead the writer was sent out in charge of a reconnaissance party by the historical society. The plans for this expedition called for the locating and mapping, as far as possible, of all village sites and ruins in that portion of the northeastern San Juan drainage lying within the State of Colorado. The summer's work showed that the most thickly settled district had been the Piedra Valley with its bordering benches and hills. Preliminary explorations made during the two previous seasons had demonstrated that here was a fertile field for archeological research, but the extent and number of sites to be found was not fully appreciated until the completion of the 1923 investigations. From the junction of the Piedra and San Juan Rivers, just below the town of Arboles (fig. 2), there is an almost unbroken line of former house sites and ruins extending northward on both sides of the river for a distance of over 15 miles (24.1395 k.).

A great majority of the sites indicate the remains of jacal villages of Pueblo I and early Pueblo II periods, but in a number of instances the heaps of débris unquestionably cover the ruins of stone dwellings erected during the Pueblo II horizon. The Chimney Rock Mesa and lower spurs jutting out from it are literally covered with the remains

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[36] Jeancon, J. A., 1922, p. 5; Jeancon, J. A., and Roberts, F. H. H. jr., 1923.

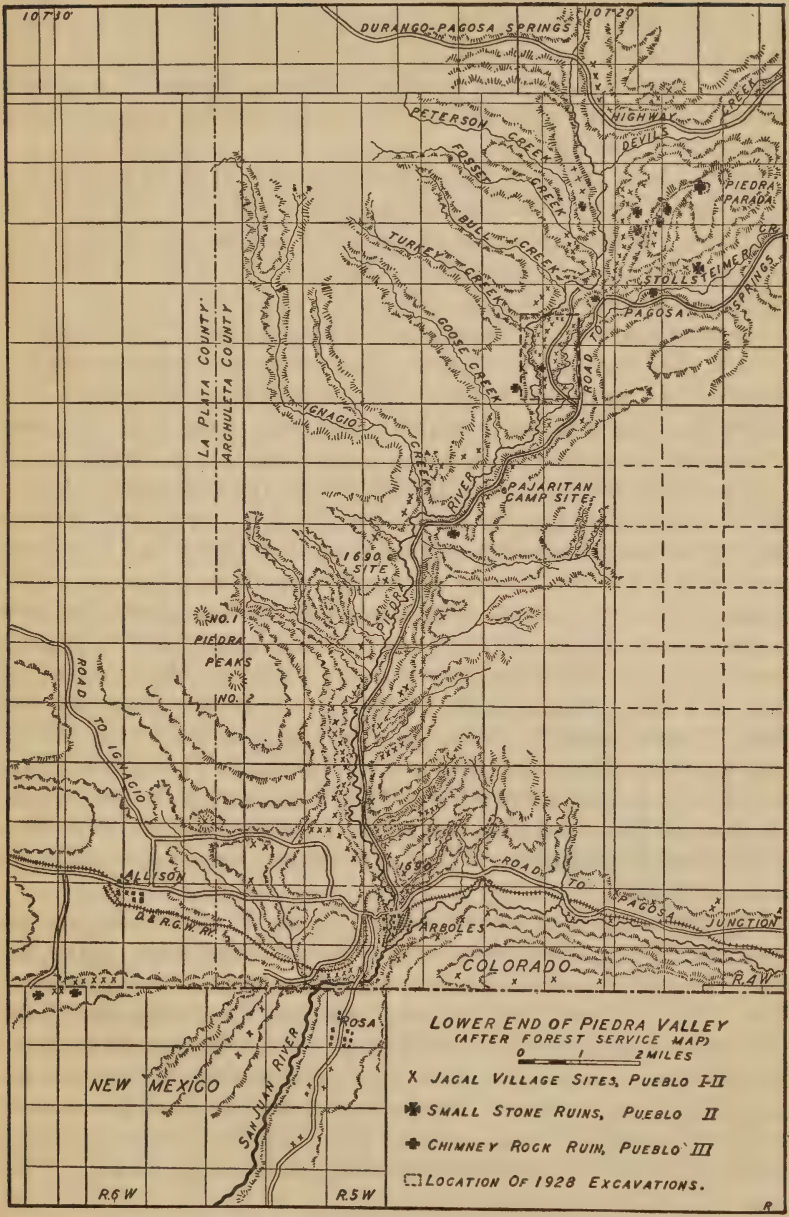
107°30'
107°20'
DURANGO-PAGOSA SPRINGS
HIGHWAY
PETERSON CREEK
FOSSET CREEK
DEVIL CREEK
PIEDRA PARADA
BULL CREEK
TURKEY CREEK
STOLLSTEIMER CR.
PAGOSA SPRINGS
GOOSE CREEK
ROAD TO
LA PLATA COUNTY
ARCHULETA COUNTY
GNAGIO CREEK
RIVER
PAJARITAN CAMP SITES
1690 SITE
PIEDRA
NO. 1
PIEDRA PEAKS
NO. 2
ROAD TO IGNACIO
ALLISON
D & R.G.W. RY.
1690
ROAD TO PAGOSA JUNCTION
ARBOLES
COLORADO
R.4W.
ROSA
NEW MEXICO
SAN JUAN RIVER
R.6W
R.5W
LOWER END OF PIEDRA VALLEY
(AFTER FOREST SERVICE MAP)
0 1 2 MILES
X JACAL VILLAGE SITES, PUEBLO I-II
SMALL STONE RUINS, PUEBLO II
CHIMNEY ROCK RUIN, PUEBLO III
LOCATION OF 1928 EXCAVATIONS.
R

FIGURE 2.—Map of the lower Piedra Valley

of stone buildings. As previously mentioned, there is the large pueblo belonging to the third period which occupied the major part of the operations of the 1921 and 1922 expeditions. On the lower level of the same formation there are 110 mounds marking the location of former unit-type or one-clan villages. It can be said with jutification that the cultural center of the district lies on and around the Chimney Rock Mesa.

An even later period is represented, however, at three localities in the valley. One of them belongs to phase a of Pueblo IV, while the other two represent phase b of the same period. There does not seem to have been a permanent building at the early IV location, which was probably nothing more than a camp site. Pottery fragments from it are of the characteristic Pajaritan form [37] found on the Pajarito Plateau in New Mexico. The other two sites, one on the mesa top just above the town of Arboles and the other on the west side of the river 6 miles (9,656.1 k.) upstream, show that they were occupied at some time during and subsequent to the Pueblo revolt with its attendant reconquest, 1680–1700. In the Governador, Burns, and Frances Canyons, 30 miles (48,280.5 k.) south of Arboles (fig. 1), are many ruins which date from that period and it is quite possible that the Piedra sites represent a northern extension of the groups which lived there. There seems to be little doubt but that the latter were Jemez people. It is recorded in some of the Spanish documents that, following their decisive defeat by Capt. Miguel de Lara and Don Fernando Duran de Chavez in the battle of San Diego Canyon, June 29, 1696, the Jemez people fled to the Navajo country, where they remained for several years.[38] That small groups should have drifted on north into the Piedra section is not surprising, because they must have known of the region and its attractions, either through traditions or from a first-hand knowledge gained by hunting parties.

A glance at the map of the valley (fig. 2) is sufficient to give the reader an idea of the number and distribution of ruins in the district. It will be well, however, to call attention to Stollsteimer Mesa, lying between Stollsteimer Creek and the Piedra River, the area inclosed in dotted lines on the map. The 1923 expedition found that 30 villages had at one time been scattered over its top and surface indications suggested that most of them had been the scene of Pueblo I activity. Because of the plans for the summer's work it was not possible to make an intensive investigation of any of the sites.

The field work planned for the season of 1924 by the historical society provided for a continuance of the reconnaissance of the preceding year. Three weeks at the beginning of the season, however, were diverted to superficial investigation of one of the Stollsteimer Mesa sites. Due to a lack of time and laborers, little was accomplished before the expedition had to move on and resume its map-making activities. Enough was done, however, to demonstrate that valuable information was to be secured by careful and intensive work in such village remains.

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[37] Kidder, A. V., 1915, pp. 417–447.

[38] Twitchell, R. E., 1911, vol. 1, p. 410.

At the close of the 1924 season the writer terminated his connections with the historical society. The following year some additional work was done under the direction of Mr. J. A. Jeancon, who had been with the National Geographic Society's Beam Expedition in 1923, at a site some miles north of Stollsteimer Mesa, and with that investigations in the district came to a close. The historical society's activities were diverted to other fields in 1926 and 1927. When it became apparent that the Colorado organization had definitely withdrawn from the field in the Piedra district and that the season of 1928 would see its expedition engaged in excavations in another part of the State, the writer determined to return to the region and to devote the summer to a thorough examination of the Stollsteimer Mesa villages. That the promise of the preceding seasons was fulfilled is shown in the results which furnish the bulk of the material which is presented in this report.

To those who are familiar with the Southwest in general and the problems of its archeology in particular the Piedra region presents an environment not quite in keeping with the usual dry and barren localities in which ruins are found. The country is composed of many small and comparatively deep canyons, plateaus, and small mesas bordering on the relatively broad, rich valley of the Piedra itself. (Pl. 1, *a*, *b*.) The fertile soil of the valleys where abundant crops could be grown; the heavily wooded slopes of the hills with their spruce, piñon, and cedar trees for house-building material and firewood; the never-failing water supply of the Piedra and some of its tributary creeks; together with the natural defenses offered by the mesas, furnished an ideal location for Indian villages. That the prehistoric inhabitants of the region took full advantage of it is shown by the many remains of their one-time communities.

Game is still fairly abundant in the higher levels where the inroads of civilization are yet to be felt. Deer, an occasional elk, bear, mountain lion, fox, and wild cat are to be found. On the mesa tops and along the streams rabbits are still plentiful and until very recently quail, grouse, and the wild turkey were abundant. Many bones found in the refuse mounds of the villages show that the prehistoric settlers did not suffer from a lack of flesh in their diet.

Progressive desiccation of the region can not be offered as an explanation for its abandonment because at the present time it is fully capable of supporting an Indian population equal to that which once lived there. The only satisfactory reason seems to be that the people were forced to withdraw to the large centers farther south and west where they could more effectively protect themselves against nomadic raiders. The Piedra Valley in a small way illustrates what must have happened, on a much larger scale, throughout the entire area. The oldest villages, those of Pueblo I and early II, are scattered in profusion along the lower benches above the river in open and unprotected places. When the unit-type stage of stone construction was reached in later Pueblo II the houses were erected on higher levels in more easily defended locations. They also were concentrated within a smaller area so that forces could be combined with greater facility. The outstanding example of the Pueblo III period in the district is the Chimney Rock ruin which was built on the highest, most inaccessible spot available. At the head of the trail leading up to the ruin from the lower mesa are the remains of a towerlike structure about which there can be no doubt as to function; it commands the only approach to the big pueblo and must have served as a guardhouse.[39] The upper Chimney Rock Mesa would have been an ideal place in which to withstand attacks but it was so isolated from the other centers that discretion probably decreed its abandonment and the migration of the people toward the Chaco.

There is a certain historical interest to the Piedra in addition to its archeological attractions. The river itself was known comparatively early in the history of the Southwest. The two intrepid friars, Silvestre Velez de Escalante and Francisco Atanasio Dominguez, and their eight companions, who were seeking a northern route from Santa Fe, N. Mex., to Monterey, Calif., crossed it on the 7th of August, 1776. In their diary they record the fact that they came upon another river, called the Piedra Parada, very close to its juncture with the San Juan. In fact, they must have crossed the Piedra only a short distance above that point. They comment on a large meadow located at that place and give it the name of San Antonio, making the observation that it was suitable for the raising of crops if some irrigation was used. They note further that all of the other things which settlers would need, such as timber for building, firewood, stone, and pasture lands, were close at hand.[40]

It is hardly likely that any of this little band of explorers saw the Chimney Rock or Piedra Parada, because their route was such that they would not have been able to see it without climbing some of the higher peaks to the north of the course which they pursued. Whether the river took its name from the rock or vice versa seems to be a matter of question. The former is the more logical because the name, which means standing rock, is hardly appropriate for a river. If such was the case the question naturally arises as to whom the credit should be given for first seeing and naming the formation. It undoubtedly was some explorer who traversed the region prior to the advent of the friars. During the terms of Governor Cachupin in the Spanish province of New Mexico, 1749–1754 and 1761–1767, one or more expeditions were sent from Santa Fe into the San Juan country to ascertain the true character and value of the minerals to be found there. After these came the expedition of Capt. Juan Maria Rivera, who penetrated as far north as the Gunnison region, in the year 1761.[41] The friars were guided on their journey by Don Joaquin Lain, who had been a member of the Rivera party. Dominguez and Escalante mention the earlier explorers in their diary where they refer to the mines along the La Plata, or, as they call it, San Joaquin River.[42] Hence it is reasonable to suppose that an earlier party passing farther north had first come upon the large outstanding rock, named it, and then upon reaching the river applied the same designation to it.

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[39] Jeancon, J. A., 1922, p. 13.

[40] Dominguez and Escalante, 1777, p. 386.

HOUSE REMAINS

Excavations during the season of 1928 were for the most part restricted to sites lying on the upper levels of Stollsteimer Mesa. The only exception was a small village on the first bench above the Piedra River at the foot of the southern end of the mesa. (Fig. 3.) At the close of the summer's work 80 houses, 2 kivas, 6 circular depressions, and 7 burial mounds had been thoroughly examined.

The present-day investigator finds himself confronted by a rather curious paradox in the remains of these villages. Either through accident or by intent they were swept by fire, and that which destroyed the houses then makes possible their reconstruction now. The dwellings were for the most part quadrangular, one-room structures of pole and adobe mud, the so-called jacal type construction. Due to the conflagration the mud was baked to a bricklike consistency which thus far has withstood the actions of erosion to which it has been subjected during the centuries elapsing since the early Pueblo peoples dwelt there. Had it not been for this firing the adobe would have melted back into the earth from which it was taken and the unprotected poles would have decayed and fallen into dust. In many instances the timbers are no longer present, it is true, but their imprints are ineffaceably preserved in the hardened plaster. The walls and ceilings fell when the posts burned, but in many of the structures they went down as units, like a collapsing house of cards,

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[41] Bancroft, H. H., 1890, p. 339; Twitchell, R. E., 1911, vol. 1, p. 445.

[42] Dominguez and Escalante, pp. 388–389.

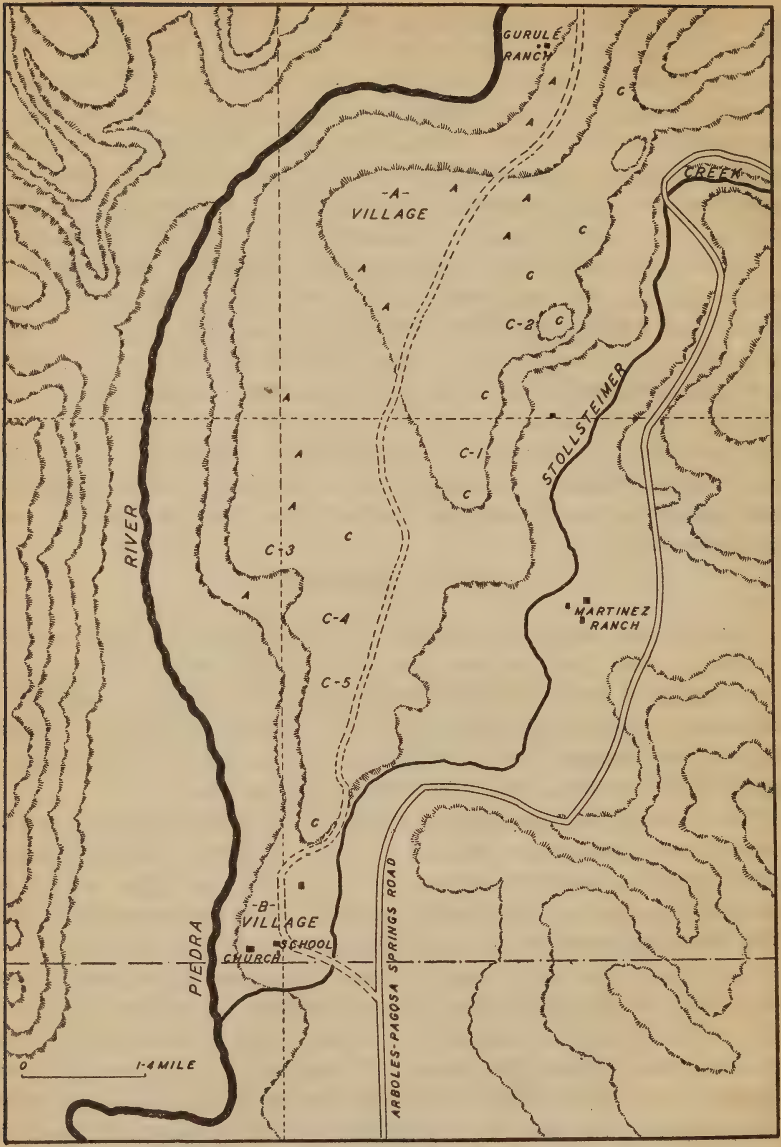

GURULÉ RANCH
-A- VILLAGE
A
C
C-1
C-2
C-3
C-4
C-5
STOLLSTEIMER CREEK
MARTINEZ RANCH
PIEDRA RIVER
-B- VILLAGE
SCHOOL
CHURCH
ARBOLES-PAGOSA SPRINGS ROAD
0
1-4 MILE

FIGURE 3.—Map of the Stollsteimer Mesa district. Letters indicate type of site

and not as a jumbled mass. Hence it is a comparatively simple matter to remove the débris, layer by layer, and determine the exact positions and manner in which the walls stood. Portions of some of the walls are still standing in a few of the houses and where such is the case bits of charred posts are to be seen encompassed by the burned

a, Northeast from the A Village, Chimney Rocks in the center

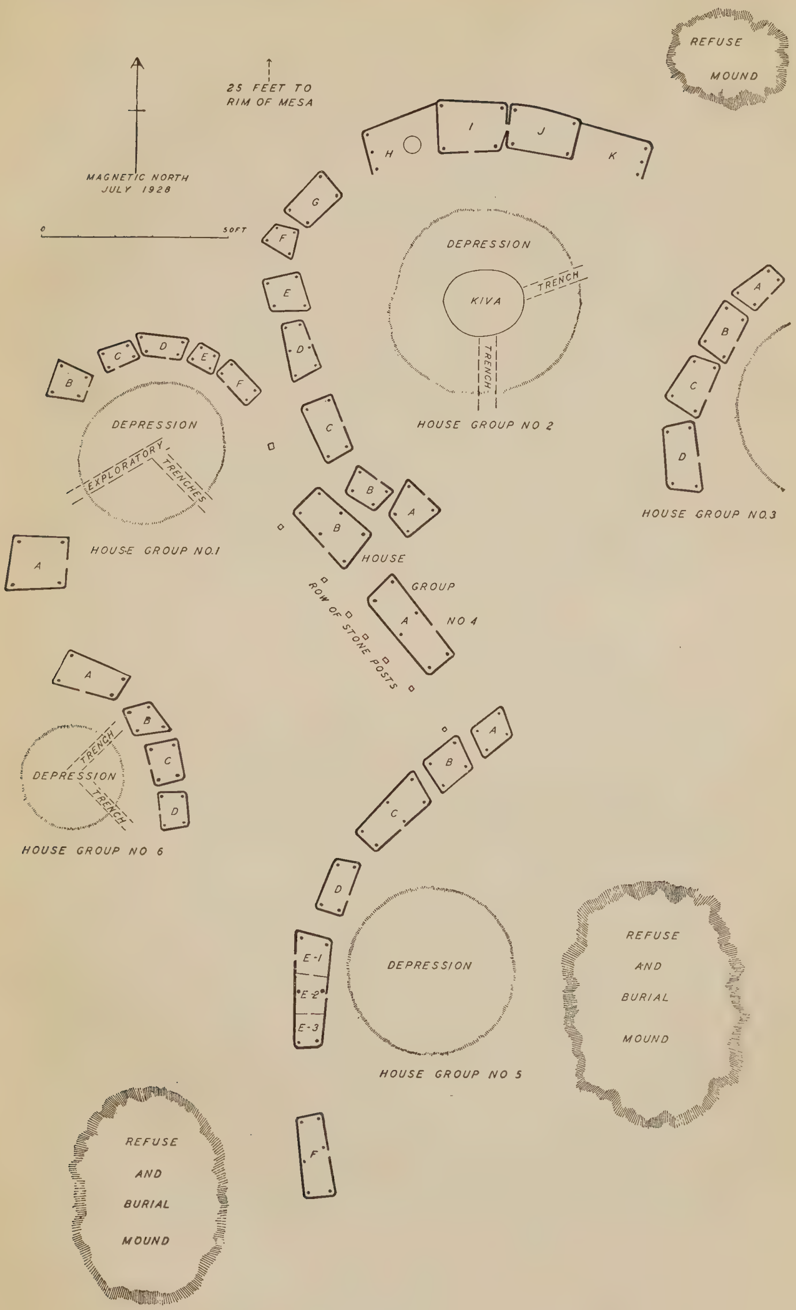
b, Looking south from the Chimney Rock Mesa

THE PIEDRA VALLEY

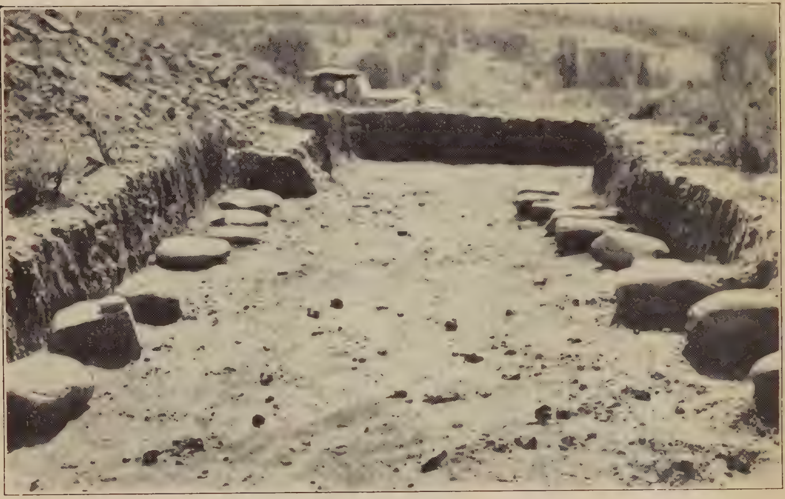
a, A portion of the main A Village

b, Unit C–1

MOUNDS BEFORE EXCAVATION


REFUSE MOUND
25 FEET TO RIM OF MESA
MAGNETIC NORTH JULY 1928
0
50 FT
H
I
J
K
G
F
E
D
C
B
A
B
A
DEPRESSION
KIVA
TRENCH
TRENCH
HOUSE GROUP NO 2
A
B
C
D
HOUSE GROUP NO.3
B
C
D
E
F
DEPRESSION
EXPLORATORY TRENCHES
A
HOUSE GROUP NO.1
HOUSE GROUP NO 4
ROW OF STONE POSTS
A
B
C
D
DEPRESSION
TRENCH
TRENCH
HOUSE GROUP NO 6
A
B
C
D
E-1
E-2
E-3
DEPRESSION
HOUSE GROUP NO 5
REFUSE AND BURIAL MOUND
F
REFUSE AND BURIAL MOUND

MAP OF THE A VILLAGE ON STOLLSTEIMER MESA



a, Rows of stones to support base logs in type A dwelling

b, Excavating Houses I and J, group 2, of the A Village

HOUSE REMAINS

clay. In general, it may be said that the dwellings were grouped in small clusters of from 3 to 15 houses, built quite close together but rarely touching. Each such unit tended to a crescent shape, due to the fact that the structures were erected around the borders of a circular depression, the remains of the pit from which the adobe used in the construction of the houses was taken. The usefulness of the depressions did not end there, however. Some of them served in the construction of underground ceremonial rooms or kivas, others functioned as reservoirs, and still others as dance courts or plazas.

The location of such former village units is shown on the surface, in most instances, by a low, greatly eroded mound with the circular depression either at one side or in the center. Where the houses had been destroyed by fire the mound is usually covered with large blocks of the burned adobe, as well as with potsherds and broken stone implements. In some cases no pottery fragments are found on the surface because of the long period of time during which the remains have been exposed to the action of the elements. In others the elevation has been washed over until there is but the slightest suggestion of a depression or of rooms about the depression. In practically all cases a heavy growth of sagebrush covers the sites. (Pl. 2, *a*, *b*.)

Evidence secured in the excavation of the house remains shows that while all belonged to the general type which is called jacal, the various structures may be classified under three subheadings. This classification is based upon certain characteristic features in their construction. To simplify discussion the various forms will be listed as Class A, Class B, and Class C. The first comprises a group of houses which had sloping walls; the second, dwellings with perpendicular walls; and the third, a combination of perpendicular walled houses and small masonry structures. In all probability the forms evolved in the order listed. The C group unquestionably was later than the A form and the B style would seem to bridge the gap between them. It is a well-known fact, however, that aboriginal house forms, as well as other factors of the material culture of a people, did not always develop along what, under present conditions, would appear to be the most logical lines. Consequently, it is essential that there be some tangible evidence to show that a certain form bore the suggested relationship to the others. That it might be the natural step leading from one to another, according to the modern point of view, is not sufficient. The evidence upon which rests the belief that the house types appeared in the order named will be considered at some length at the end of the following description and discussion of the three forms.

Class A Houses

Over half of the ruins excavated belonged to this group. Most of them were located at the northern end of Stollsteimer Mesa along the edge of the bluff, which rises 100 feet (30.48 m.) above the Piedra River at that point. They were gathered together in what might be termed a village composed of a number of units, each of which consisted of several dwellings bordering one of the depressions mentioned in a previous paragraph. The major portion of the village is indicated on the map. (Pl. 3.) Additional units were investigated at some distance east and south along the edge of the bluff, but inasmuch as they were too far removed from the others to make their inclusion in the map practicable they have been omitted. House Group 3 was not complete and its original extent can not be given. The eastern portion of the unit had been worked out at some previous date and a portion of it had been plowed, so that it was impossible to determine the size and positions of the houses or to trace the limits of the refuse and burial mound which lay to the southeast.

At five other locations on the mesa-top isolated units of the Class A group, probably constituting single family centers or one-clan villages, were excavated. Inasmuch as all were typical and since the similarity between them and the units included in the village here represented was so marked, it has not been deemed necessary to print the additional plans. Indications were that a village could have consisted of a single unit or have been made up of several in the case of the community at the northern end of the mesa.

There were certain outstanding characteristics common to all the houses, although there was some individual variation in minor features. The structures were, with a single exception, one-roomed and quadrilateral in form. Some closely approached the rectangular in outline but the majority were too asymmetrical to be so designated. Rarely did the corners form right angles. Most of the dwellings were erected over a shallow pit so that the floor level, which was the bottom of the pit, was somewhat below the general ground level. The depth of these pits varied from house to house but all fall within a range of from 6 inches (15.24 cm.) to 2 feet (60.96 cm.), with the majority averaging 1 foot (30.48 cm.). The floor was usually hard-packed earth, although occasionally it was plastered with adobe. In not one instance was stone paving in evidence.

The superstructure was supported on posts set in the floor at a distance of from 12 to 18 inches (30.48 to 45.72 cm.) from the corners of the room. Some of the larger houses had two additional posts. In such instances the extra supports were placed at about the center of each side wall and at approximately the same distance from the side wall as the corner posts. The main pillars probably were crotched at their upper ends and carried stringers which in turn supported the smaller roof beams and also the slightly sloping side walls. The latter had a framework of small poles, from 2 to 4 inches (5.08 to 10.16 cm.) in diameter, placed from 4 to 6 inches (10.16 to 15.24 cm.) apart. These sloped from the walls of the pit to the stringers on the main posts. The wall poles were not embedded in the earth at their lower ends, but rested on the floor and were held in position against the walls of the pit by heavy logs. The method in which the latter were used was characteristic. Those at the ends of the room were lying on the floor, while the longer ones which held the framework for the side walls were placed on top of the end logs and supported at intervals along their length by large stones. In some structures only three or four stones were used while in others a whole row of them was deemed essential. (Pl. 4, *a*.)

Some of the individual variations in house construction were observed in connection with the placing of the base logs along the walls. Where the main support posts for the superstructure were only a short distance from the wall the base beams were wedged tight between them and the wall poles. When the builders had miscalculated this space, however, they were forced to place large stones between the support posts and the base logs to hold the latter in position.

The heavy roof beams were overspread with small poles, brush, and leaves. The entire wooden framework of the structure was then covered with a 6 to 8 inch (15.24 to 30.32 cm.) layer of plaster. One rather curious feature observed in connection with this plaster covering was that the adobe was applied only to the outside of the framework, where it was carefully smoothed down. Traces of the builders' hands are frequently observed on the burned clay, and the wall poles were completely hidden from view. Only such mud as worked its way through between the poles when it was being applied to the exterior appeared on the inside walls. This was smoothed down, however, so that here and there the timbers were covered with a thin coating of it, but a greater part of the poles must have been exposed. It was, perhaps, this very feature which made possible such a complete burning of the buildings. Had the poles been embedded entirely in adobe, fire would have had little effect on them. The ceilings of the structures would have been quite combustible, but not the walls.

Entrance to the dwelling seems, in most cases, to have been gained through small doorways in the sides of the houses. Actual doorways, with two exceptions, were not present in the ruins, but the large stone slabs which were used to close them were frequently found in positions which indicated lateral openings. These stones were generally lying on top of the wall débris with one end resting either on the ground at the edge of the pit or on the charred remains of the base logs. Indications were that in a majority of cases the doorways opened toward the depression. A few of the house remains suggested that the smoke hole in the center of the room had served as an entrance.

On the basis of the information gained from a careful study of the débris which filled all of the house pits it has been possible to reconstruct the dwellings as outlined in preceding paragraphs. In order to illustrate the house type more clearly, however, the accompanying postulated reconstruction has been prepared. (Fig. 4.) The view presented is that which would have been apparent had the back wall of one of the structures been removed. The really questionable feature in the drawing is that of the doorway. Evidence obtained was not such as to definitely establish the height of the sill above the floor nor the exact dimensions of the opening. An average of the size of the stone covers found was used in determining the latter, while the former is based on parts of walls in two dwellings which indicated that the opening had been from 6 to 10 inches (15.24 to 25.4 cm.) above the ground level. The average size of the stone covers, which were oval in shape, suggests that the doorways ranged between 2 and 2½ feet (60.96 and 76.2 cm.) in width and 3 and 3½ feet (91.44 cm. and 1.0668 m.) in height.

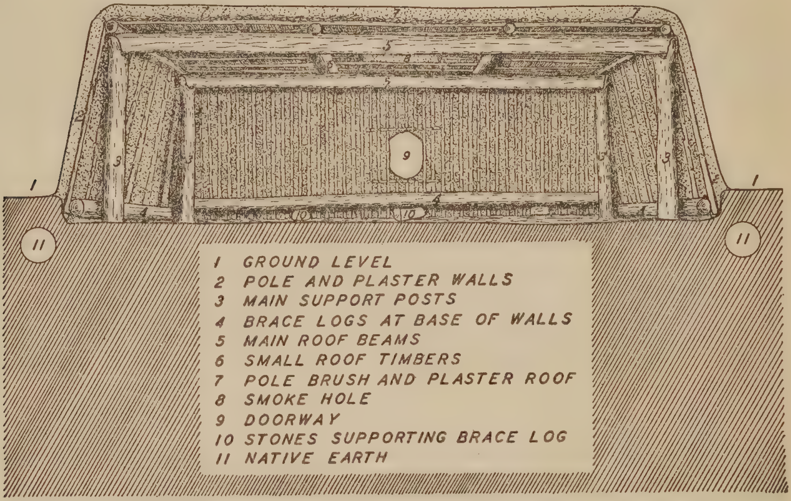

1 GROUND LEVEL
2 POLE AND PLASTER WALLS
3 MAIN SUPPORT POSTS
4 BRACE LOGS AT BASE OF WALLS
5 MAIN ROOF BEAMS
6 SMALL ROOF TIMBERS
7 POLE BRUSH AND PLASTER ROOF
8 SMOKE HOLE
9 DOORWAY
10 STONES SUPPORTING BRACE LOG
11 NATIVE EARTH

FIGURE 4.—Postulated type of construction in the Class A houses

While this may seem to have been small, such doorways would compare quite favorably in size with many in the stone structures of later periods. The general reader must bear in mind the fact that the customary practice of the Pueblo builders was to make the openings into their dwellings only as large as was felt to be absolutely necessary. Inasmuch as they were restricted to the use of stone slabs, skin, or textile hangings for doorway coverings, small openings were an advantageous feature.

The method of timber arrangement at the base of the walls was indicated in so many of the pits that there can be no question as to its correctness. The roof construction was clearly shown in the remains of three structures—Group 1, A and F and Group 4, A—where the whole mass had dropped into the pit as a unit and could be uncovered, turned over, and fitted together so that the impressions in the plaster showed that small poles and brush had rested upon the heavy timbers whose charred remnants were lying on the floor. Fragmentary sections of the roofs of other dwellings showed that they, too, had had similar construction. The ceiling height no doubt varied, but measurements of the wall material and a few support posts which had not been completely consumed by the flames indicated an average of 6 feet 6 inches (1.9812 m.). There also must have been some variation in the size of the smoke hole. Evidence in the roof plaster indicated a range between 2 feet 6 inches and 3 feet (76.2 and 91.44 cm.) for the sides of the opening. In many of the structures the edges of the smoke hole had been reinforced with a coping of stones placed around it on the roof.

There was practically nothing in the way of interior furnishings in the houses. Some of them had fire pits in the floor near the center of the room. In others there was no special provision for the fire, which seemed to have been built directly on the floor under the smoke hole. Where pits were in evidence they were either roughly circular in form or tended to the rectangular. Sometimes they were lined with stones and occasionally they were simply plastered. The circular forms ranged between 1 foot 6 inches and 2 feet (45.72 and 60.96 cm.) in diameter. Measurements for the other forms showed about the same average size. Rectangular pits were from 1 foot to 1 foot 6 inches (30.48 to 45.72 cm.) in width and 2 feet to 2 feet 6 inches (60.96 to 76.2 cm.) in length. It is interesting to note in connection with this reference to the fire pits in the houses that many had been built in the open, but in locations where the houses would more or less serve as windbreaks. This is a very common feature in southwestern ruins and indicates that when the weather permitted considerable cooking was done outside of the houses.

Not a single structure of the Class A group had a corner storage bin. There were no storage holes in the floor, which is in contrast to many dwellings of earlier and later periods, where the feature is not at all uncommon. Their absence may be accounted for in some measure by the fact that the people seem to have made use of the space between the side wall base logs and the floor for storage purposes. Many of the bowls and smaller jars which were recovered from the ruins were found sitting on the floor against the wall of the pit in positions which indicated that they had been placed under the raised side logs.

No provision was made, apparently, for mealing bins. All of the grinding stones or metates found in the remains of the dwellings were on the floor along one of the side or end walls, and in not a single instance was there the slightest indication of an inclosing bin of any of the forms so frequently reported by investigators working in other types of ruins.

There were a few of the dwellings in the village at the northern end of the mesa which call for special consideration. The majority of them conformed so closely to the average house type already described that a detailed discussion and description of each would be superfluous. The combination of structures at the northern end of house group 2 (pl. 3) was so unique, however, that some additional paragraphs may be profitably devoted to it. When work was first started on the mound which covered the débris filled pits (pl. 4, *b*) it was thought that a connected group of four houses would be uncovered, but as the excavations progressed it became apparent that such was not the case, and that there had been in reality but two houses. Each of these was different, however, from all of the others investigated in that it had a shed at one end.

The two houses, I and J (fig. 5), were of the characteristic Class A style of construction. They differed to a certain extent, however, in that they had doorways in one of the end walls. These apertures were so placed that they were directly opposite, and formed in a broad sense a single opening between the two rooms. Contrary to what seems to have been the general plan in doorway construction, their sills were on the floor level. No cover slabs were found, and it is suggested that they were left open so that the structures functioned as a two-roomed house rather than as distinct and separate dwellings. This raises a question which, unfortunately, can only be answered by speculation, Was any effort made to cover the openings so that a short passage resulted or were they left open to the weather? If the walls of the houses had been straight instead of slanting, no such provision would have been necessary. As it was, however, the two doorways barely touched at one side, the

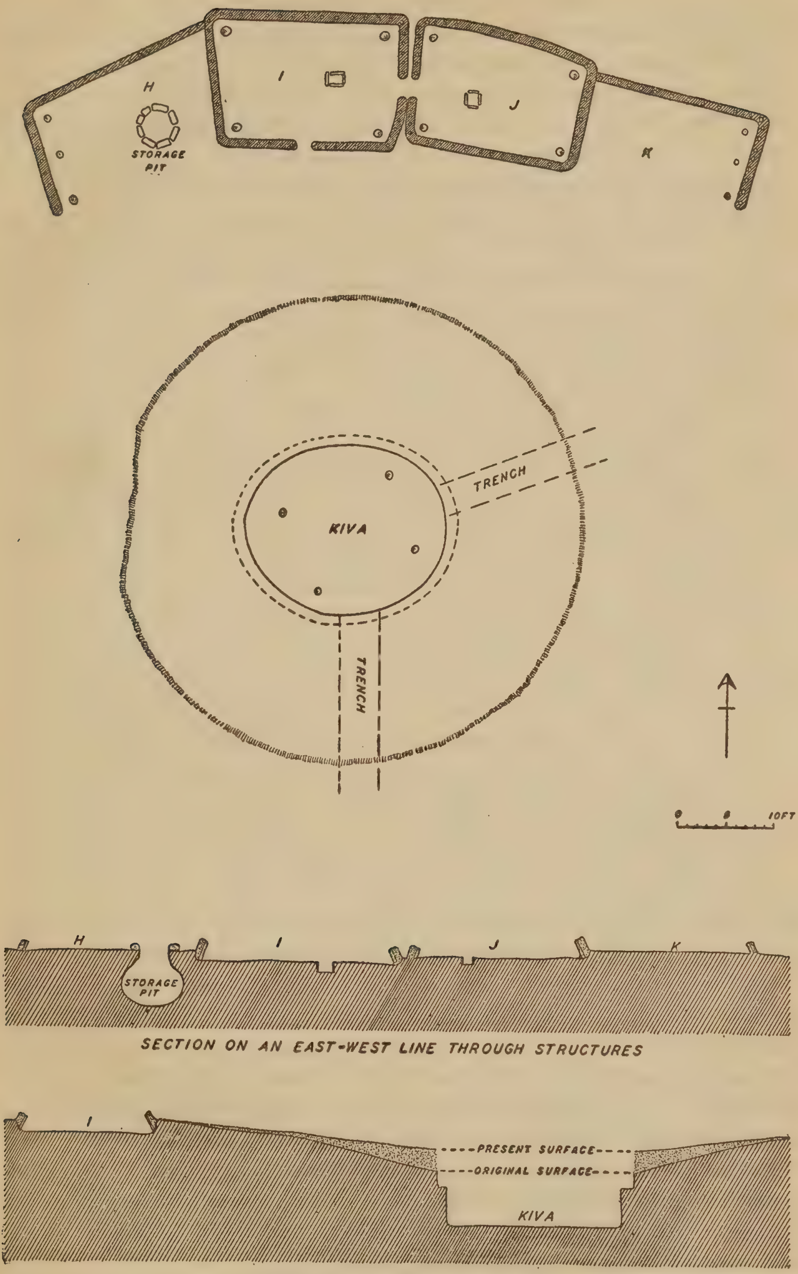

H
I
J
K
STORAGE PIT
TRENCH
KIVA
TRENCH
10FT
H
STORAGE PIT
I
J
K
SECTION ON AN EAST-WEST LINE THROUGH STRUCTURES
I
PRESENT SURFACE
ORIGINAL SURFACE
KIVA
SECTION ON NORTH-SOUTH LINE

FIGURE 5.—Detail ground plan of portion of House Group 2 in the A Village

south, and then only at the bottom of the wall. Consequently, unless some measures were taken to roof over the openings or to build a short passage, the inhabitants must have been subjected to no little inconvenience, if not actual discomfort. Every time it rained water would have run down the slopes of the walls, through the doorways, and into the houses. This would have been particularly troublesome for the occupants of I, as its floor was several inches lower than that of J. It seems logical to suppose that if the doorways were left exposed the people would have made some efforts to prevent an inflow of water; that they would have constructed the usual type of entrance with raised sill. Since they did not it seems plausible to believe that there was some sort of covering, possibly one made of poles, brush, and plaster, which connected the two. Unfortunately, at the time when the particular débris which might have contained the desired evidence was removed, the writer was engaged in the problem of the storage pit in the floor of shed H. The workmen did not call attention to the doorways between the two structures until it was too late to make a careful study of the débris at that point. The fact that no evidence of such construction was found might be taken arbitrarily to show that none existed and the question thus summarily dismissed. Considering all things, however, it seems more in keeping with other features, which indicate that the people had a fairly well-developed discernment in house building, to suggest that some means must have been taken to inclose the doorways, although the manner in which it was done can not be known. The only dimensions which could be secured for these openings were the width of each and the wall thickness at that part of each house. There was only a small variation in doorway width. The opening in I measured 1 foot 8½ inches (52.07 cm.), while that in J was 1 foot 9½ inches (54.61 cm.). The average wall thickness at the sides of the doorway in I was 1 foot (30.48 cm.), while in J the average was 10¾ inches (27.3 cm.).

House I had another doorway, in the south wall, which opened toward the circular depression of the house Group 2 unit. House J had no additional opening, at least no traces of one were found, and its only means of access to the exterior seems to have been through house I. The suggestion that the two structures might have served as a two-roomed dwelling instead of being separate domiciles developed out of this feature. The second doorway in I was of the characteristic form indicated in the other house remains throughout the village. Its height could not be determined, but the width at the sill was 1 foot 6 inches (45.72 cm.).

Both structures had interior fire pits. They were of the rectangular type and had been lined with small stone slabs. Neither was very large. That in I measured 1 foot by 2 feet (30.48 by 60.96 cm.) and was 1 foot (30.48 cm.) in depth. The one in J was 1 foot 6 inches (45.72 cm.) by 1 foot (30.48 cm.), with a total average depth of 9½ inches (24.13 cm.).

Sheds did not play a very prominent part in the building activities of the dwellers on Stollsteimer Mesa because the only examples of such structures found during the course of the summer's work were the two associated with the I and J house combination. They were of comparatively simple construction and indications were that they had not been erected until after the completion of the houses. Three upright posts supported their roofs at the outer ends, while the inner probably rested on the house tops. There were no traces of support posts along the ends of the houses. The walls were slightly different in form from those found in the dwellings. This was no doubt due to the fact that the floors were on the ground level and not below it. (Pl. 5, *a*.) The wall poles did not have heavy base logs to hold them in position. Instead, their lower ends were embedded in the earth. Since the structures were lean-tos, it was only necessary to erect two walls for each, the ends of the houses furnishing the third, and the fourth, the southern side, was left open. It is very probable that a greater part of the fair weather activity around the dwellings took place in these lean-tos or sheds. Judging from the practices of the present-day Indians in the Southwest, the families probably lived during the entire summer season in the sheds, retiring to the houses only when cold weather set in.

Greatest interest centers in the shed marked "H" (fig. 5) because of the fact that within its confines a large storage pit had been located. This pit had been dug into the soil of the mesa top. Its walls were carefully plastered with adobe mud. As will be seen from the section of the house group (fig. 5), the pit was somewhat similar in shape to some of the large pottery jars which the people made. The narrow necklike opening at the top had been inclosed by a ring of stones placed on the floor (Pl. 5, *b*.) A large stone slab had been used as a cover, but it had been broken, presumably when the structure burned and the roof crashed down onto the floor. Fragments of the cover slab and a number of the stones which had been used in the coping around the mouth were found in the débris in the upper part of the pit. That it had been used as a granary was shown by the carbonized corn which practially filled its lower half. On the floor, in one corner of the shed, were two large metates or milling stones. These suggested that the women had ground their meal at a spot as convenient as possible to the main supply of grain.

Grain pits were not a common feature in the village. Only one other example was found. The latter was discovered when investigations were being made in house Group 3. It had been in that portion of the unit which had previously been dug out and partially plowed. The earlier excavators had missed the pit, however. That it had not been discovered before was undoubtedly due to the fact that the remains of the structure in which it had been placed underlay a portion of a Class C dwelling which had been erected on the mound which covered a part of the eastern end of the Group 3 unit. This superposition contributed one of the outstanding bits of evidence as to the relationship between the Class A and Class C houses. Unfortunately, because of the previous digging, it was not possible to secure all of the information essential to the drawing of a plan showing the stratigraphic conditions which the site presented. It was, in fact, very discouraging to find that the only place where superposition had occurred had been so worked over that a detailed study could not be made of it. The reason for its disturbance is not hard to suggest. Being the only place in the village where portions of stone walls were to be found, it was the first to attract the attention of amateur investigators in search of "curios." Here, as well as elsewhere in the Southwest, there have been many such diggers, hence the irreparable loss of valuable information.

The second grain pit was filled with blocks of burned roofing, stones, and a considerable quantity of burned corn. The largest metate found during the summer was lying on top of the burned corn toward the bottom of the pit. The owners of this storage place also, it would seem, prepared their cornmeal in close proximity to the pit.

The storage pit in the house Group 2 shed was capable of holding a considerable quantity of corn. The opening at the top was circular in form with a 3-foot (91.44-cm.) diameter. The main portion of the pit at its greatest diameter measured 6 feet 6 inches (1.9812 m.). The bottom of the pit was 6 feet (1.8288 m.) below the ground level. The pit in the disturbed remains of Group 3 did not narrow down to as small an opening as the other. The mouth was more oval in contour with a diameter on an east-west line of 3 feet 6 inches (1.0668 m.) and on a north-south line of 4 feet (1.2192 m.). The body of the pit was also oval in contour. It measured 5 feet 6 inches (1.6764 m.) on the north-south diameter and 4 feet 5 inches (1.3462 m.) on the east-west. The bottom was only 4 feet (1.2192 m.) below the floor level.

Although only two grain pits were found in the Stollsteimer Mesa village it must not be thought that they were the only provision made by the people for the storage of their crops. Many of the smaller structures in the various units probably served a similar purpose.

The latter were too small to have been very useful as dwellings. They contained no fire pits and evidence of lateral doorways was missing in each. The only exterior opening seems to have been a hatchway in the roof. Many of them contained large quantities of burned corn, which is a good indication of their function. The structures which seemed to belong in such a category were: House Group 1, E; house Group 2, E and F; house Group 5, A and B; and house Group 6, B. Additional supplies of corn and beans were stored in large pottery vessels which were kept in the dwellings.

The circular depression to the south of the H, I, J, and K combination of structures furnished the only indications found in this village that the people may possibly have had an underground ceremonial room or kiva. Excavations showed that there had been a subterranean room in the center of this depression, the one which belonged to the house Group 2 unit. The traces of this room have been felt to be the remains of a kiva. Such may not have been the case, but certain features in it were so similar to comparable ones in the unquestionable kiva of the Class B house group village at the foot of the southern end of the mesa that it is thought to have been such a structure.

Moisture, more than anything else, was the main factor in the great deterioration found in the remains of the subterranean chamber. For this reason it was almost impossible to obtain any extensive information on the question of the kind of ceremonial room associated with villages of the A class house type. The pit portion of the structure had been dug in the center of the depression which remained after the removal of the earth used in mixing the adobe for the construction of the Group 2 houses. That it was so placed had a great deal to do with the amount of moisture which collected in it. Almost all of the surface drainage from the house mounds must have run into it. Even after débris washed down from the house remains and wind-blown sand had completely filled it, as well as practically obliterating the encircling depression, considerable water collected and stood there. The Mexican workmen stated that in the spring when the late snows are melting the depressions in the various house units scattered throughout the Piedra district hold water for weeks at a time and they always refer to them as "the little lakes."

With conditions such as those described in the preceding paragraph it will readily be understood how the walls of the room and other features, particularly those formed from mud plaster, would rapidly deteriorate. At the time when the investigations were being made the lower 4 feet (1.2192 m.) of the débris which filled the room were so saturated with water that excavation work was exceedingly difficult. This was well along in the summer and no rain had fallen for months. In wet seasons there must have been a much larger water content and preservation conditions just that much less favorable.

Among the few ascertainable facts concerning the underground chamber were: The outlines, general size and depth; that it had been covered with a superstructure supported by four posts placed upright in the floor at some distance from the walls; that there was a small encircling bench at the top of the wall; and that there had been a fire pit near the center of the room. The ends of three small logs lying on top of the encircling bench indicated that it had served as a wall support for the roof beams extending out from the central posts. The style of roof construction may well have been like that found in the kiva of the Class B village described in another section of this report.

There were no remains of a ventilator at the southern side of the room. There was a slight depression in the wall which suggested that originally there may have been one which has since disappeared, but of this there is no certainty.

The floor was so moist and hard to follow that it was impossible to determine whether or not there had been a sipapu, a small hole in the floor, usually at the north side of the fire pit, which is held to be symbolical of the mythical place of emergence through which many southwestern Indians believe their ancestors passed on their journey to this earth from the underworld. Neither were there any indications of a fire screen or deflector. The latter was a short, low wall, consisting of stone masonry, a single upright slab of stone, or of jacal construction; frequently found in Basket Maker III houses and later-day kivas.[43] It stood between the opening into the passage or ventilator and prevented cold air from blowing directly onto the fire. If this so-called kiva had not had a ventilator, as is possible, there would have been no need for a deflector.

Conditions in the underground room during the period of its occupancy must not always have been of the best. Even with a domelike superstructure covered with earth, possibly even with plaster, considerable moisture must have reached the interior through seepage from water collecting in the depression around it. During the winter months when the ground was frozen it would not have been so bad, but in the late spring and after occasional heavy summer rains the interior must have been quite clammy. One suggestion in this connection is that the village dwellers, like some of their more recent descendants, performed most of their major ceremonials during the

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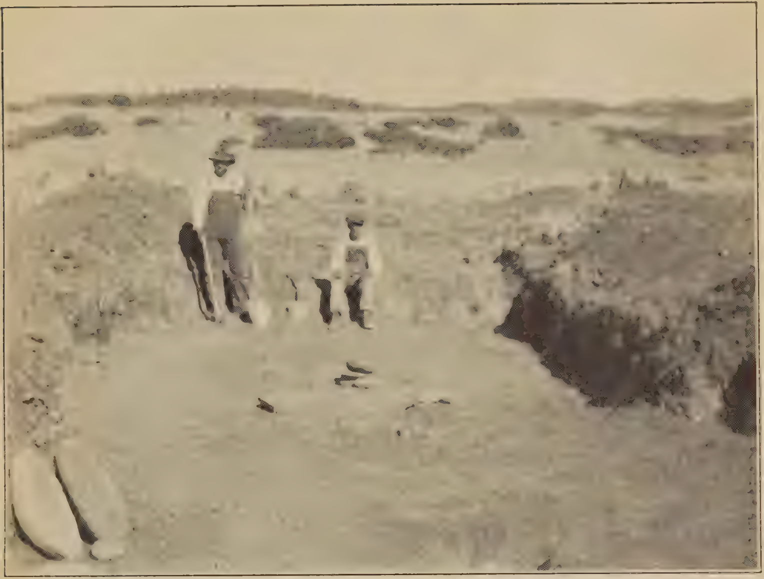
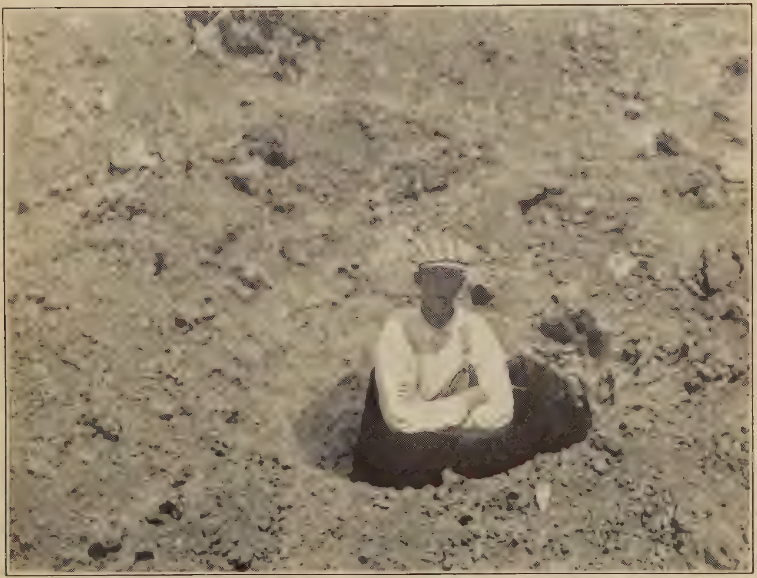
[43] Roberts, F. H. H., jr., 1929, pp. 29, 32, 84.

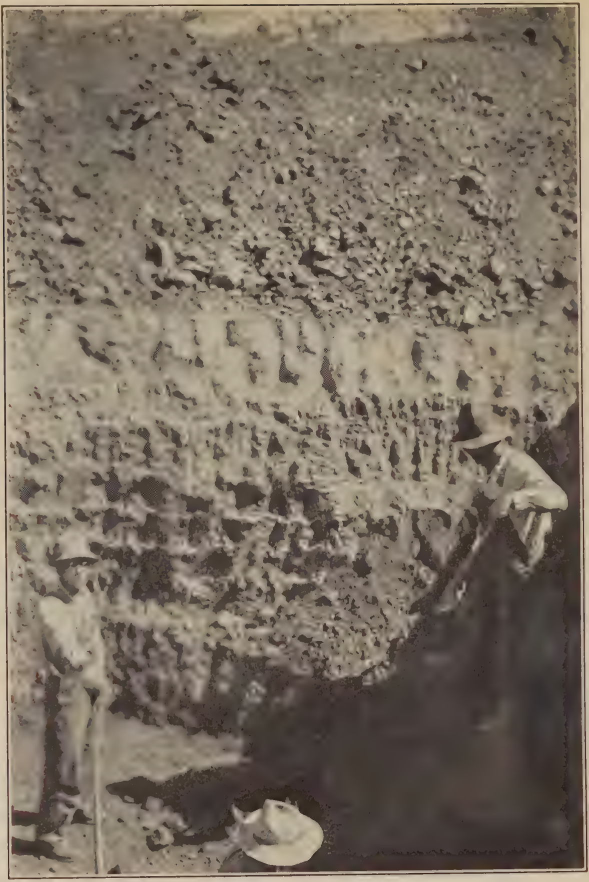


a, Floor of J, House Group 2. Workman seated on floor of Shed K

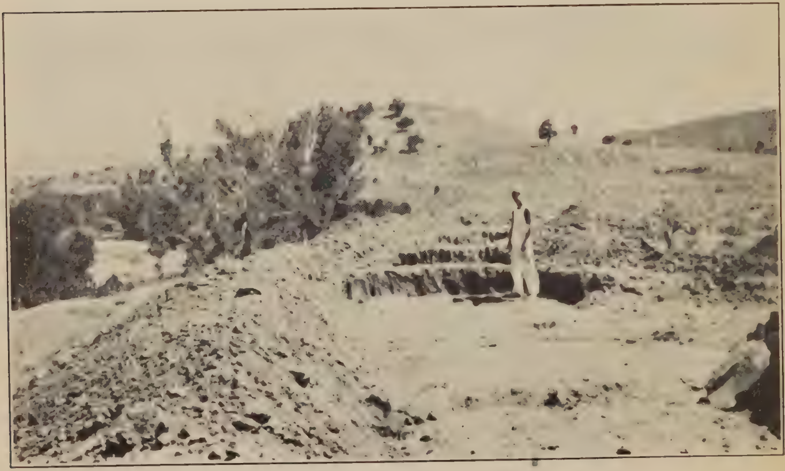


b, Opening into storage pit in floor of Shed H

HOUSE REMAINS



a, Excavating kiva in the A Village



b, Portion of the B Village at foot of mesa

HOUSE REMAINS

winter months when the kiva was quite habitable, while the lesser observances were held in the summer and out of doors. This may also explain the dance-plaza feature recorded by other investigators of circular depressions associated with villages of this type. The latter was for the summer ceremonies.

The depression in which the kiva was located was quite large. On its east-west diameter it measured 48 feet (14.6304 m.) and on the north-south 51 feet (15.5448 m.). The kiva pit was more oval in contour. It measured 21 feet (6.4008 m.) on the east-west diameter and 18 feet (5.4864 m.) on the north-south. The floor was 8 feet (2.4384 m.) below the present ground level and 6 feet (1.8288 m.) below the surface of occupation during the period of the village. (Pl. 6, *a*.) The small encircling bench at the top of the pit wall was 4 feet (1.2192 m.) above the floor. The top of the bench had an average width of 1 foot 4 inches (40.64 cm.) and was 1 foot 8 inches (50.8 cm.) below the original ground level. The support posts for the superstructure averaged approximately 10 inches (25.4 cm.) in diameter.

The circular depressions associated with house groups 1 and 6 (pl. 3) were trenched in an effort to obtain further data on the subject of their possible secondary function. It was hoped that another kiva might be discovered in one of them, but the exploratory trenches revealed nothing suggestive of such a structure. As a matter of fact, the only use to which they could have been put, judging from all the available evidence, after the completion of the houses was for reservoirs. There were many fine lines of water-deposited silt and sand in the material which filled the depressions. The entire aspect of each was such as to conclusively indicate that water had stood in them over a considerable period of time. They apparently were never thoroughly cleaned out but grew shallower and shallower as the collecting surface water dropped its silt and windblown sand drifted in. Their usefulness as reservoirs must have continually diminished, although it is possible that occasional repair work on the houses with an attendant removal of small quantities of mud from the pit may have checked the filling-in process to a certain extent.

There was no indication that any of the depressions in the group at the northern end of Stollsteimer Mesa had been used as a dance plaza. Mr. J. A. Jeancon in his work for the Colorado Historical Society in 1925 partially excavated a depression in a jacal unit several miles farther north along the Piedra and uncovered what seemed to be such a feature. The periphery of the depression had been bordered with large river bowlders, the floor was hard packed, and there was a fire pit in the center. There were no indications, however, of any kind of superstructure.

There was one other structure in this village which warrants some additional mention. It was E in house Group 5, the only A dwelling found during the entire summer's investigations which contained more than one room. The house had been built in the same fashion as the others, but upon its completion the interior had been partitioned off into three compartments or rooms. This was accomplished by the erection of walls of typical jacal construction. They differed from the main house walls, however, in that they were perpendicular. The lower ends of the small poles which formed the framework were embedded in the earth floor. The manner of their attachment to the ceiling timbers at their upper ends is not known, but they were quite likely tied in some fashion, perhaps with yucca cords or willow withes. The wall poles were very small in comparison with those used in the main walls. They seemed to have averaged about 1 inch (2.54 cm.) in diameter. The spaces between the poles were small, averaging about three-fourths of an inch (1.9 cm.). To complete the partition a very thin coating of plaster was applied to the surfaces of the poles. There was no evidence of wattling, the weaving of small poles or twigs through the uprights, such as is found in some sections of the Southwest where wattle and daub construction was used.[44]

Communicating doorways connected the rooms or compartments. These openings were in the center of the partition walls and each had a stone slab for a sill.

There was only one fire pit in the house. It was in the central room and strictly speaking could not be considered a pit, inasmuch as it was not a hole in the floor. Instead, a ring of adobe plaster had been placed on the floor approximately in the center of the room and in this the fire was built. This ring was 5 inches (12.7 cm.) thick and averaged 3 inches (7.62 cm.) in height. It was oval in contour and the interior, where the fire was built, measured 1 foot (30.48 cm.) on the north-south diameter and 8 inches (20.32 cm.) on the east-west.

Evidence was that there had been but a single smoke hole for the structure and it had been above the fire ring in the middle room. The main measurements for this structure, as well as for others in the village, will be found in the table at the end of this report. Consequently there is no need to include them in this discussion.

One rather curious feature in the mesa-top village was the row of stone posts along the southwest side of the house Group 4 unit. What their purpose was is not known. They stood about 1 foot (30.48 cm.) high on an average and were set into the ground at a depth sufficient to hold them in an upright position, but not to withstand any great amount of stress. Hence, it can not be supposed that they were foundation stones for some kind of structure. There were no remains of posts or poles associated with them and it does not seem likely that there was a brush shelter at that side of the houses.

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[44] See Judd, N. M., 1926 b, pp. 71, 75, for a discussion of wattle walls.

The stones were placed along the upper edge of a slight slope and the ground level dropped away from that point toward house Group 6. At first it was thought that they might have formed a part of a terrace at that side of houses A and B, but further investigations showed that such was not the case. The only explanation for their presence seems to be that they were so placed to mark a boundary. Perhaps they formed the division line between the part of the village belonging to the house Group 6 people and that of the 4 group. One of the outstanding characteristics of modern Pueblo life is the allotting of definite portions of each village to a clan. The practice seems to be one of considerable antiquity and may well date from the very beginning of the Pueblo cultures when each family group seems to have possessed its own little cluster of houses, any number of such units being gathered together to form a village, as in the one under discussion.

The location of the village refuse mounds is shown on the map (pl. 3) and does not call for any detailed discussion. The two at the southern end of the village were the most extensive, although it is very probable that the small one at the north side was originally much larger. It was along the rim of the mesa and considerable quantities of the waste material deposited there had undoubtedly been carried over the edge by surface water and wind action. Even though it covered a small area this mound contained a great amount of ashes, house refuse, and other matter from the village. A major portion of it lay within and completely filled a small gully which had been eroded in the mesa at that point prior to the construction of the houses. The refuse was in places over 5 feet (1.524 m.) in depth. The other mounds obtained a maximum depth of but 3 feet (91.44 cm.) but their total content was much larger because of the greater area which they covered. All were very compact, no doubt a result of the long period of time during which they had been subjected to the settling action of rain and snow.

The material in the mounds was characteristically like that in all the refuse heaps associated with southwestern ruins. Sand, ashes, small stones, countless flakes from the chipping of arrowheads, worn-out metates, broken manos or hand stones used in grinding corn, broken stone hammers and mauls, bone implements, potsherds, bird and animal bones. Considerable interest in those of the Stollsteimer village grows out of their size. They could not have obtained such depth and proportions unless the site had been occupied practically continuously over a period of some years. This would indicate that the village was a permanent one and not a temporary farming center inhabited only during the brief summer season.

The refuse mounds served an additional function besides that of being mere places for the disposal of waste matter from the village. They were also the cemeteries. In them were deposited the remains of the deceased members of the community. That the dead were interred in such places was probably due to the fact that it was much easier to dig a grave in the relatively loose refuse than in the compact virgin soil. Another explanation which is sometimes given is that the superstitious beliefs of the people required that in death the body be surrounded by the substance of life, even though it be the refuse of the living. The latter interpretation seems rather far-fetched because where refuse mounds were not available burials were frequently made in shallow graves scooped out of the top soil and the bodies were not covered with refuse as would be expected if the theory were based on sound presumptions. It is much more likely that the refuse-mound burial practice was founded on the question of convenience rather than on mere superstition or such a belief as the one given in the suggested explanation.

The subject of burials and the disposal of the dead, from the standpoint of the actual method of interment, position of the body in the grave, mortuary offerings, and other characteristic features connected with the final rites for the deceased, is to be considered at some length in another section of this report, so that further discussion may be omitted for the present.

Class B Houses

The dwellings which are grouped under this heading were also of the jacal type of construction but showed a decided improvement in building methods over those of the Class A form. The main supports for the roof were removed from the interior of the room and incorporated in the walls. The latter were no longer slanting, as in the former group, but became perpendicular. The removal of the posts from the interior of the house was a factor of some advantage from the standpoint of convenience and the saving of floor space, but the shift in wall position had a much greater significance. It made possible the combining of many structures into a single large building, one of the outstanding characteristics of the Pueblo periods from the second on down to the present day. (Pl. 6, *b*.)

There were other differences in the methods followed in the erection of the B style of dwellings. The pit portion became somewhat shallower, although the tendency to a depressed floor remained.

Base logs were no longer used to hold the wall poles in position. Instead, a narrow, shallow trench was dug around the borders of the floor and the butt ends of the poles placed in it. Occasionally they were held in position in the trench by stones wedged in on both sides, but on the whole they appeared to have been secured only by the use of adobe mud. The method of fastening them to the roof poles at their upper ends is not known but the problem involved must have been relatively simple. The wall poles were set at greater intervals in these structures than in those of the A class. (Pl. 7, *a.*) The average space between them was 1 foot (30.48 cm.). The fact that the walls were perpendicular lessened the need for more timbers, as the mud would have a greater tendency to stand by itself. During later periods, in sections where the adobe form of house persisted, timbers completely disappeared and the walls were built entirely of clay material. The southern Colorado peoples had not reached that stage, however, when the structures under consideration were erected.

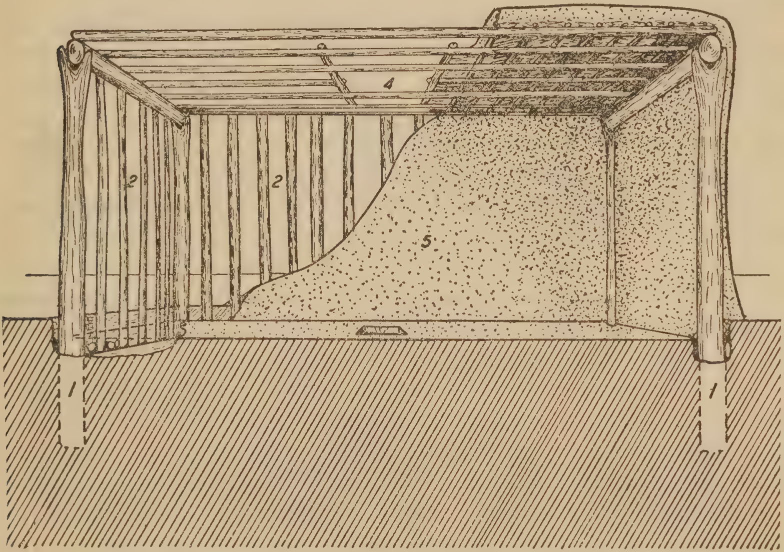


FIGURE 6.—Postulated construction in the B type houses. 1, Main support posts; 2, Small wall poles; 3, Roof timbers; 4, Opening for smoke hole; 5, Plastered wall

Roofs of the dwellings were supported by six or eight posts sunk to a depth of 2 feet (60.96 cm.) in the ground and incorporated, as previously mentioned, in the walls. (Fig. 6.) There also was a difference in the arrangement of the heavy roof timbers. The main beams crossed the short way of the room instead of running parallel with the long walls as in the A houses. Small poles and brush placed on top of the heavy crossbeams completed the framework upon which the adobe plaster covering rested. It seems rather strange that the builders of the A houses did not discover that less material and shorter timbers could have been used had they constructed their roofs in the same fashion. The only structure in the entire village at the northern end of the mesa which might possibly have had the heavy beams so placed was E in house group 6, but even in the remains of that dwelling the evidence was not conclusive enough to warrant the statement that the roof form had differed from the others.

Minor features, such as the smoke hole, fire pit, and doorway, did not differ, beyond slight individual variations, from those described in the A group. The doorways, when present, were in the sides of the houses and were covered with large stone slabs. Fire pits were either of the rectangular or circular form. Some were lined with small stones, others were merely faced with plaster.

The houses in general must have presented a more pleasing and finished appearance than did those of the first group described. This would be true of the interior especially. Without the heavy base logs or interior support posts and with the wall poles completely covered by the plaster, they must have looked not unlike some of the present-day adobe dwellings in the Southwest.

House remains of the B form were found at a number of locations, but the best examples were in a village at the foot of the southern end of the mesa where all but two had been of that class. The two exceptions were of the A form. The unit plan of grouping continued in communities of this type. The dwellings were built along the edges of the pits in which the mud used in the wall construction was puddled, pits which remained to form the characteristic depressions at one side of the house group.

The Class B village (fig. 7) seems to have been predominantly a one-clan community, assuming that a unit of several structures grouped around a depression represents a single clan cluster, with possible accretions of two or three families who built their dwellings somewhat removed from the others. The structures lettered I, J, K; L; M and N, probably represent three such additions.

Houses I and N were of interest because they were the only ones in the whole village that had been of the A style of construction. All evidence obtained in the excavations indicated their contemporaneity with the B houses. This raises a number of questions of considerable importance concerning the two forms of dwellings. Were two groups of people living in the district at the same time, one building one type of house, the other another form? Were the two examples of the class A dwelling found in this village built by people who moved

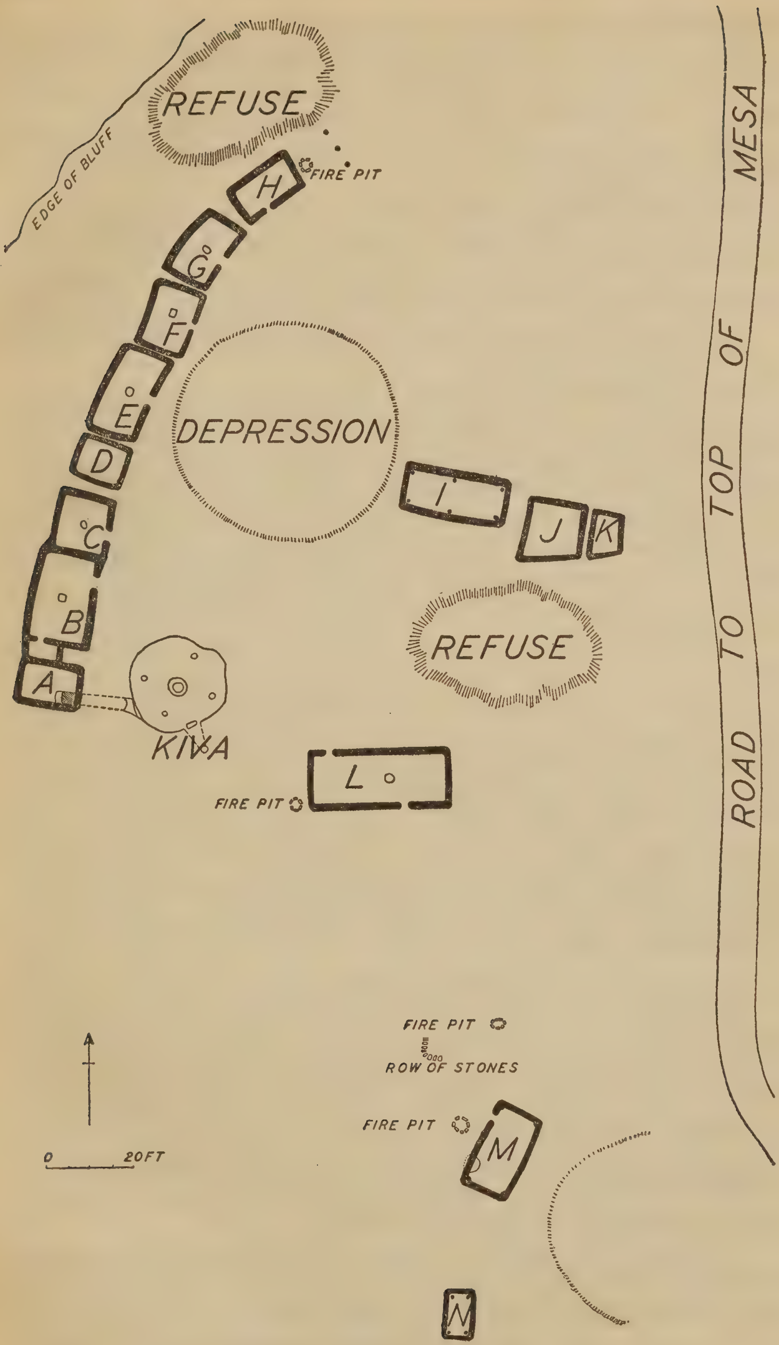

EDGE OF BLUFF
REFUSE
FIRE PIT
H
G
F
E
D
C
B
A
DEPRESSION
I
J
K
REFUSE
KIVA
FIRE PIT
L
ROAD TO TOP OF MESA
FIRE PIT
ROW OF STONES
FIRE PIT
M
N
0
20FT

FIGURE 7.—Map of the B Village

down off the mesa and joined the others? Were they a survival of an older form, or was the other type the first and this the appearance of a newer one? Answers to these questions may seem somewhat involved, but out of the apparent confusion it is possible to derive a rather clear picture of the state of affairs existing during the lifetime of the community.

There was nothing to indicate a simultaneous occupancy of the region by peoples of different culture. As was brought out in the introduction, Pueblo I was a period of instability, of many fluctuations and changes, and the present house problem is just one example of it. Certain groups had reached a higher stage in house development than their fellows.

Once the principles of house construction embodied in the B type, which evidence shows to have been of later development, had been discovered, the change to that form must have been comparatively rapid. There unquestionably were a few who, even as the conservatives of the present day, resented the innovation and adhered to the old-established ways of building. There must have been some villages in the district at the time when the Class B community was in existence which were exclusively of the A house type. The two structures in the B village could easily have been built by people who had left one of the other settlements and attached themselves to the exponents of the newer form of dwelling. On the other hand, it is just as possible that they were erected by conservatives within the group. This particular part of the problem is immaterial inasmuch as in either case the houses represent the continuance of an older form. One factor which must be borne in mind is that an abrupt change from one type to another should not be expected unless, perchance, there was a complete replacement of one culture by another, one which brought with it an already standardized type of architecture. In the present instance there was no such occurrence.

The point to be emphasized is that the Class B houses occupied the seemingly paradoxical position of being later than, yet contemporary with, the A dwellings. Such a condition is not unusual and may be observed in certain sections of the United States to-day where houses erected according to the dictates of the latest style in architecture within the last 10 years stand next door to dwellings of the colonial period built more than 200 years ago. Offhand they are considered contemporary, yet they represent two distinct stages in the development of our American culture.

Evidence for the later development of the B houses is so closely interwoven with certain features of the C form that the proper status of the former can not be clearly shown until the latter has been discussed. Proof of the relationship also depends, to some extent, on the association between lesser objects of the material culture and the house type. Hence, it would seem that until the various elements can be drawn together to form a complete picture, discussion of this highly important point should be deferred.

Although the houses had reached a stage in their development where they could readily be combined into buildings of several rooms, a majority of those in the B village had been erected as separate dwellings. That there was an appreciation of the possibility of such a consolidation of structures, was shown in only one building. The latter had a number of interesting points and warrants a detailed discussion.

The house and kiva combination (fig. 8) at the southern end of the main section of the village was the only example of such a feature found. The inclosures marked "A," "B," and "C" had been of the typical B form of construction. Although ultimately a single structure, they did not seem to have been erected simultaneously. C was certainly added to B after its completion. There is a possibility, also, that A and B were built as separate houses and then were tied together by the construction of the closetlike B–1. No appreciable length of time need have intervened between the erection of the main rooms and that of the additions, however. C and B–1 may well have been constructed immediately after the completion of A and B, but they did indicate in their abutting walls a subsequent piece of work.

Except for the small opening between B and B–1 (pl. 7, *b*) there was no indication of communicating doorways between the rooms. A person wishing to go from B to C would have had to go outside to do so. What was of even greater interest, though, was the suggestion that A had had no opening in its walls, but that the only entrance was in the roof. It is possible that the room could be entered only through the passage which led from the kiva, but this does not seem likely.

B and C were evidently living rooms, because each had a fire pit. That in B was rectangular in shape while the one in C was of the circular form. Both were simple pits in the floor. Their walls had not been lined with stones but merely covered with plaster. Further evidence of the secular character of the rooms was observed in the fact that B contained seven metates or milling stones and three were found in C. In the fire pit of C were a number of slightly charred deer bones. Another deer bone was found in one corner. There is a deep groove down one side of it which shows that some member of the household had intended to cut it into two pieces, probably to make some implement needed in their daily life, but the bone was cast aside before the work was completed.

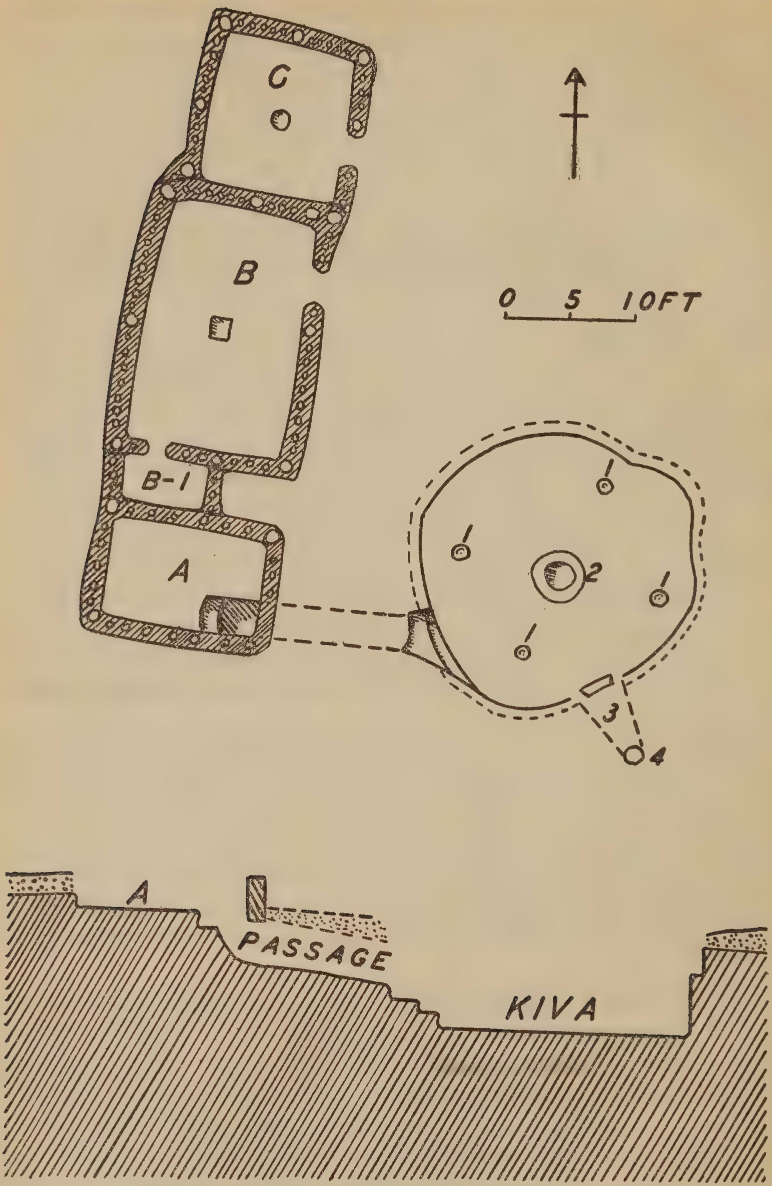
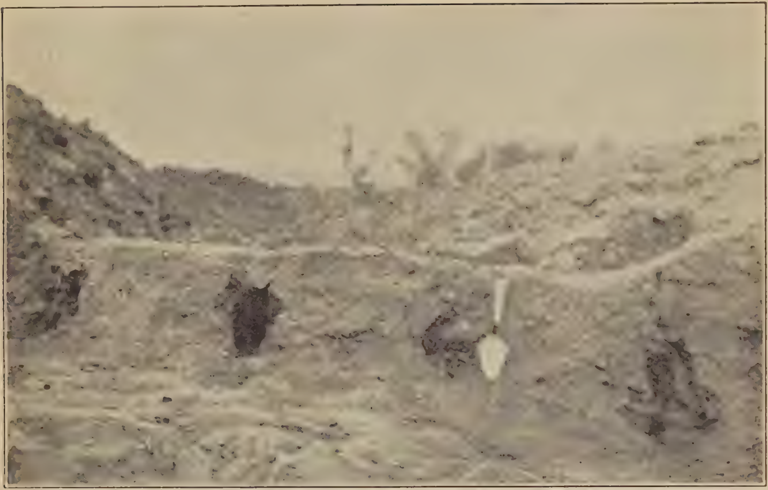
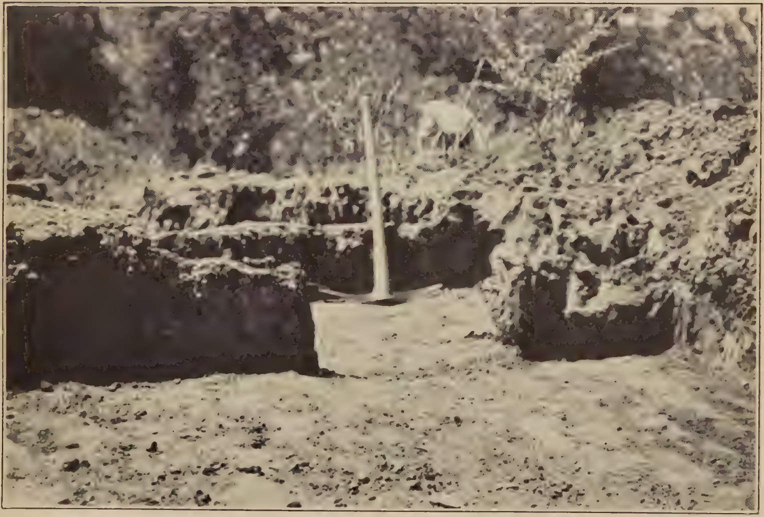


FIGURE 8.—House and kiva combination in B Village. 1, Main support posts in kiva; 2, Fire pit; 3, Ventilator passage; 4, Ventilator opening on ground level

The remains of the kiva, or underground ceremonial chamber, were discovered in an unexpected way. During the removal of the débris from the interior of the shallow pit which formed the lower portion of room A a hole was found in the southeast corner. This

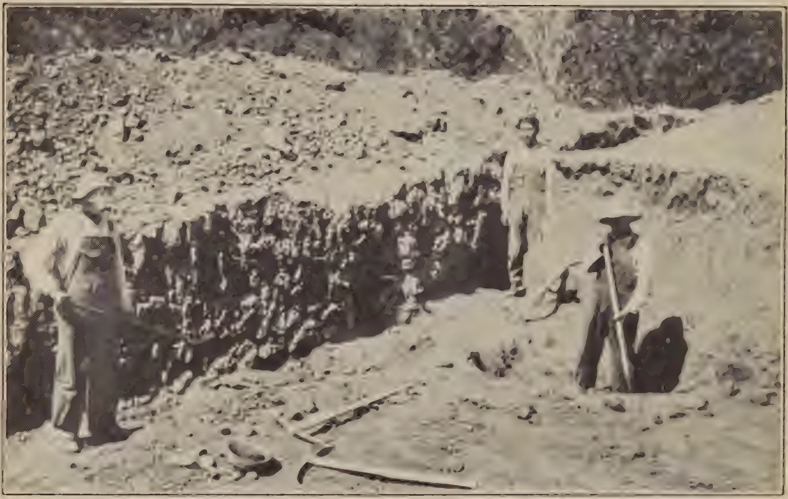


a, Charred posts in adobe wall, illustrating method of construction

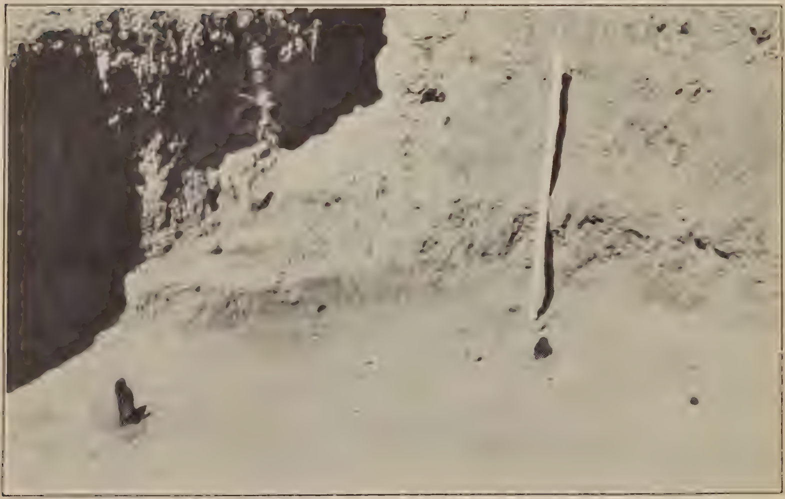


b, Doorway in wall between rooms B and B-1 of the B Village

HOUSE REMAINS

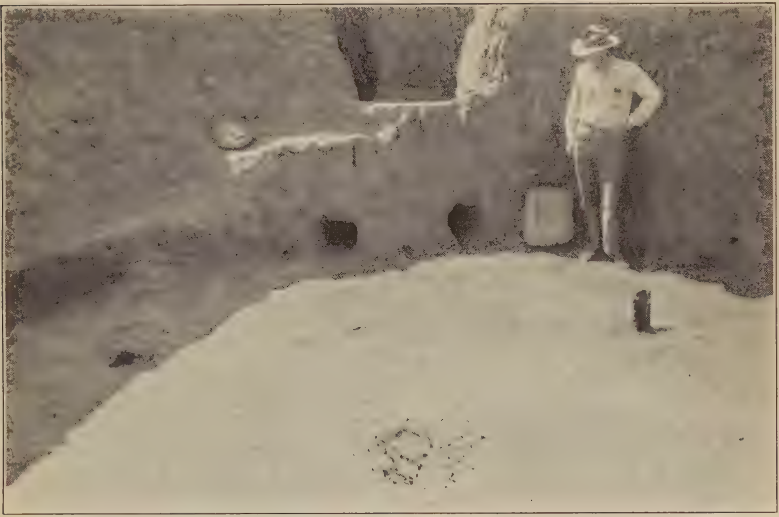


a, During excavation. Workman standing on floor of passage from House A

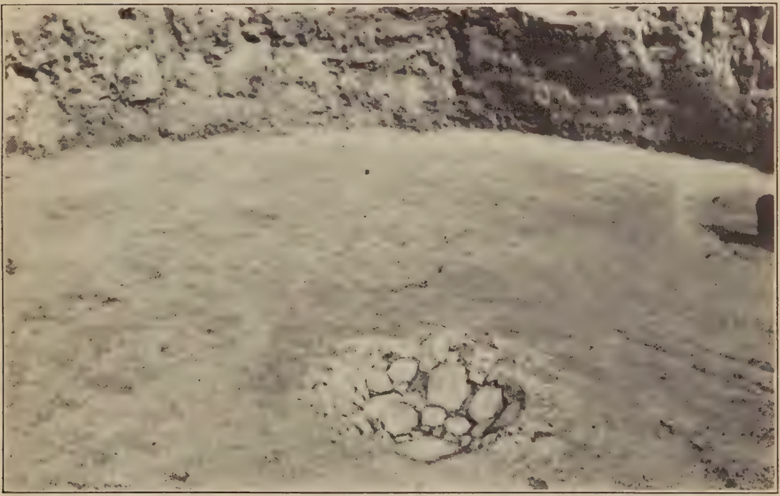


b, Steps at end of passage from House A. Same view as *a* after débris was removed from pit

B VILLAGE KIVA

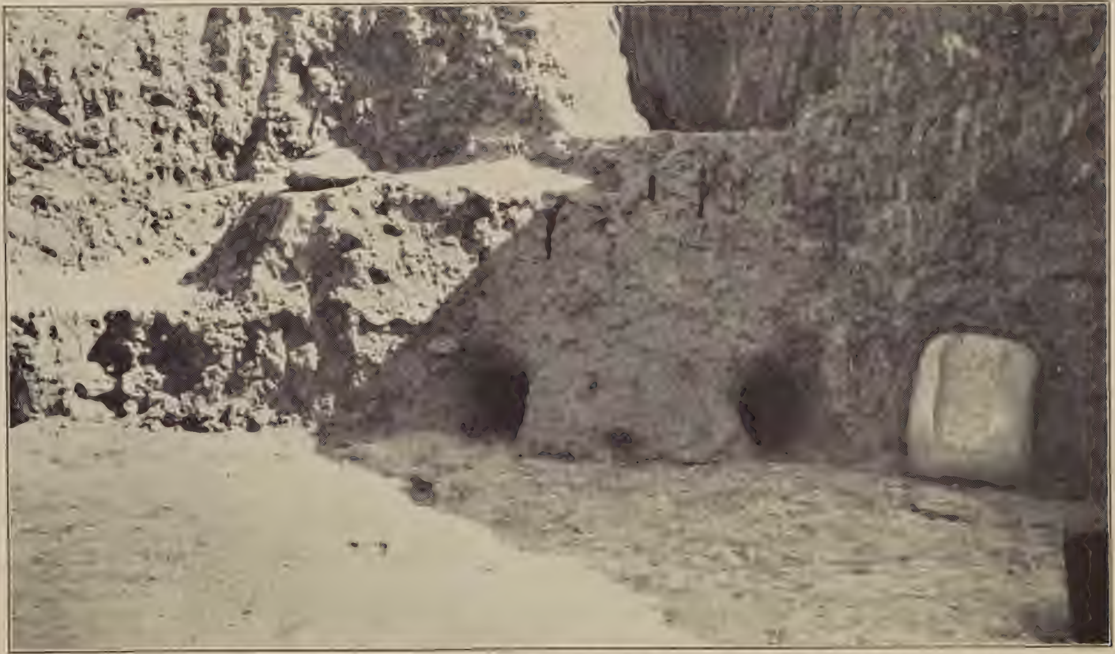


a, Ventilator opening at southeast side. Charred butts of main support posts still in floor



b, Fire pit in kiva. Portions of original wall plaster may be seen in background

B VILLAGE KIVA

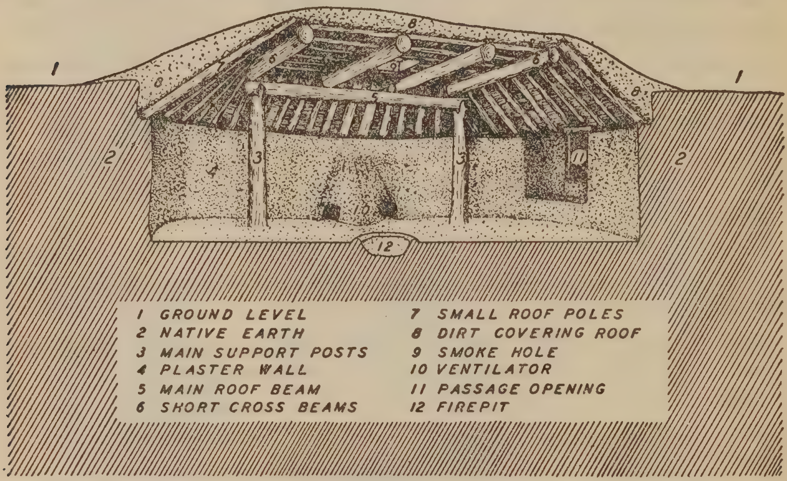


CONSTRUCTIONAL FEATURE OF VENTILATOR SHOWING UPPER ENDS OF REINFORCING STICKS USED IN FRONT WALL was at first thought to be the remains of a storage pit in the floor but, as work progressed, it soon developed that it was the entrance to what had formerly been an underground passage. The latter was followed until it ended near the edge of a circular depression. The débris at that point indicated that there had been some sort of a room into which the passage had given access. The débris consisted in large measure of adobe earth which had been washed in, settled, and packed by water until it was incredibly hard. Its removal was a long and laborious task. Tracing the walls of the inclosure at the outer end of the passageway proved the most difficult part of the entire summer's investigations. (Pl. 8, *a*.) Throughout most of the excavation work the only indication of a possible wall was a slight difference in the color of the earth. The fill contained a small amount of charcoal and to find the walls it was necessary to follow the hazy line separating the ordinary yellow earth from that containing an occasional bit of burned wood. Not until a considerable part of the débris had been removed was actual wall plaster uncovered. From that time on the work was comparatively easy. At its completion there stood exposed to view all that remained of an early form of kiva. (Pl. 9, *a*, *b*.)

The pit portion of the underground chamber had been roughly circular in form. (Fig. 8.) The walls were uneven and at the northeast side there was a considerable bulge. On the whole, however, it may be said that there was a conscious effort to make it circular, a form which is characteristic of the ceremonial rooms of most of the San Juan peoples in the Pueblo periods. Some of the late prehistoric ruins in the Kayenta district have rectangular ones, a form which is to be seen in modern Hopi and Zuñi villages. Adobe plaster placed on the earth walls and floor of the pit had been the only finish applied to that part of the chamber.

The superstructure had been supported on four posts placed in the floor at some distance from the wall. They had been securely embedded in the earth at an average depth of 3 feet (91.44 cm.). The butts of the posts were wedged tight by cobblestones which had been tamped into the dirt which filled the holes around them. The charred ends of the uprights were still in position when the débris was removed from the floor of the kiva. They indicated an average diameter of 10 inches (25.4 cm.). Three of them had been set approximately 2 feet (60.96 cm.) from the wall, while the fourth was 4 feet (1.2192 m.). This discrepancy may have been due to the fourth one having been set into the room in such a position as not to interfere with the entrance to the passage leading from room A.

Fortunately, the entire superstructure had not been consumed by the fire which destroyed the kiva. There was sufficient material in the débris on the floor to give a fairly accurate picture of the method used in its construction. On top of the upright posts, which were probably forked, two heavy stringers had been placed. These supported a series of four crossbeams upon which the flat portion of the roof rested. The sloping portion, around the sides, was built of smaller poles which slanted from the main framework to a small bench at the top of the kiva wall. (Fig. 9.) The framework of poles was then covered with quantities of brush and leaves upon which earth was heaped. A thick coating of plaster finished off the exterior surface. This superstructure gave the chamber a domelike ceiling, but furnishes no clue as to the origin of the cribbed type of roofing found in kivas of the later Pueblo periods.[45] As a matter of fact, it was much the same kind of roof, with some modifications, to be sure, as that described for the A houses. The slanting side poles had to conform to a circular pit rather than a quadrilateral one, but the same general principles of construction were followed.


1
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11
12
1 GROUND LEVEL
2 NATIVE EARTH
3 MAIN SUPPORT POSTS
4 PLASTER WALL
5 MAIN ROOF BEAM
6 SHORT CROSS BEAMS
7 SMALL ROOF POLES
8 DIRT COVERING ROOF
9 SMOKE HOLE
10 VENTILATOR
11 PASSAGE OPENING
12 FIREPIT

FIGURE 9.—Postulated method of kiva construction

A rectangular opening, the smoke hole, was left in the center of the flat portion of the roof. It had been reinforced by a series of large stones. The latter lay in practically their original positions on the charred remains of the roof material. They showed that the opening had been approximately 4 feet (1.2192 m.) square and that it had been directly over the fire pit. As a matter of fact the smoke-hole slabs framed the latter when the débris was removed from them and they were first brought to light.

The smoke hole may also have served as an entrance, although it can not be definitely stated that such was the case. It was impossible to discover whether or not the remains of a ladder were included in the burned timbers on the floor. There was a slight depression in the floor a short distance from the south side of the fire pit. This had an abraded surface and suggested that the base of a ladder may have rested in it. Judging from the kivas of later periods it may well be that there was a ladder in this one and that the main entrance was through the roof. If there was a ladder, it probably was not like those of the present day but consisted of a single log with a series of notches cut along one side to form steps.

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[45] See Roberts, 1929, pp. 81–90, for a brief discussion of the kivas of the Pueblo periods and the possible origin of many of their characteristic features.

The fire pit was located in about the center of the chamber. It was circular in form, slightly bowl-shaped in cross section and had been lined with unworked cobbles embedded in plaster. Around the pit was a raised rim 2½ inches (6.35 cm.) high. Its average width was 10 inches (25.4 cm.). The pit was 9 inches (22.86 cm.) deep and had an average diameter of 2 feet 6 inches (76.2 cm.). When uncovered it was almost completely filled with fine wood ashes.

The ventilator feature at the southeastern side of the chamber was unusual in form, when compared to the types of kivas of the better known periods, and of interesting construction. (Pl. 10.) It was unusual in that it had two openings instead of a single aperture, as is generally found. When the pit for the main part of the underground room was dug a tunnel was run out from the southeast side. This formed the horizontal passage for the ventilator. (Fig. 8, *3*.) At the outer end a vertical shaft was dug so that there was an opening on the ground level. This opening was enclosed in a ring of stones placed around it on top of the ground.

The tunnel was much larger at the kiva end than at the shaft. This no doubt was due to the digger's need for sufficient space in which to move while clearing the dirt from the passage. At best such a piece of work must have been difficult and tedious because stone picks and pointed sticks were the only tools available. Because the completed tunnel was too large to function properly, it was found necessary to reduce the size of the opening into the room. To accomplish this a small, thin wall of adobe plaster reinforced with five small sticks (pl. 10), typical jacal construction, was built across the mouth of the tunnel. The sticks rested against the wall of the kiva above the opening. The wall was not perpendicular to the floor but slanted at an angle of 18 degrees from that position. At the foot or base it projected into the room several inches, breaking the normal curve of the main wall. The actual ventilator openings were made in this closing wall. (Fig. 10.)

When the ventilator was first discovered, during the excavations, it was found that the west vent had been closed with a large stone.

When the latter was removed it proved to be a metate. It is the one shown standing against the wall in the photograph of the kiva. (Pl. 10.) The other opening had not been closed in any such fashion, but it had been filled with débris which collected after the destruction of the kiva.

For the benefit of the general reader who may not be thoroughly versed in the terminology and various features associated with southwestern kivas it may be said that the so-called ventilator was just what its name implies. When a fire was burning in the pit the heat rising from it and passing off through the smoke hole at the top would have a tendency to draw fresh, cold air down through the ventilator and into the room. Evidence in the ruins of the Southwest suggests that the feature was not originally designed for such a purpose, but that it represents a survival of the entrance found in older houses. In the beginning it was probably retained for ceremonial reasons but toward the end seems to have had only a practical significance.

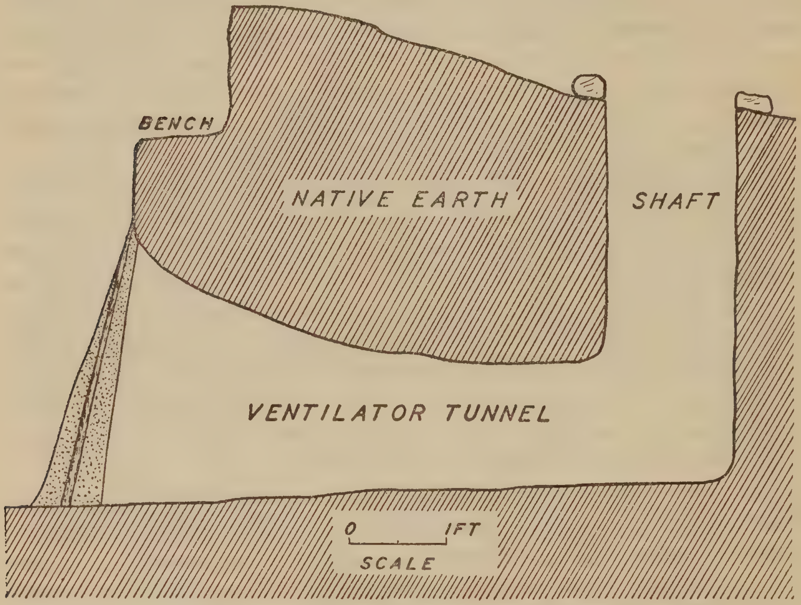


FIGURE 10.—Detail of ventilator construction

The wall which closed the inner end of the tunnel had an average thickness of 9 inches (22.86 cm.) at its base, but it became quite thin near the top. The sticks used to reinforce it averaged 1 inch (2.54 cm.) in diameter and were set at an average distance of 6 inches (15.24 cm.) apart. The vent openings were 1 foot (30.48 cm.) high and had an average width of 1 foot (30.48 cm.). The passage was 5 feet (1.524 m.) long. The walls decreased from 3 feet to 1 foot 6 inches (91.44 cm. to 45.72 cm.) in height from mouth to shaft. The width of the tunnel was 4 feet (1.2192 m.) at the kiva end and 1 foot 6 inches (45.72 cm.) where it entered the shaft. The latter was roughly circular in form and had an average diameter of 1 foot 5 inches (43.18 cm.). The shaft was 4 feet (1.2192 m.) deep at the time when the kiva was in use. The ground sloped away at that side of the structure which, together with the upward slope of the tunnel floor, accounts for the discrepancy between this measurement and the kiva depth.

Two features, mentioned in the discussion of the possible kiva in the class A village, were missing from this structure. They were the deflector and the sipapu. There were no indications that either had ever been present. The floor of the room was in such good condition that traces of them would have been apparent at once. It was quite likely that the deflector was not necessary because of the form of the ventilator. The central portion of the wall, between the two openings, would, to a certain extent, have functioned as such. Because of this the builders may have omitted the additional construction. At the present time there is no satisfactory explanation for the absence of the sipapu. The lack of such a feature is also frequently observed in kivas of the Chaco Canyon. There is probably some significance to be attached to it, but thus far none has been discovered.

The underground passage connecting the kiva and room A was of simple construction, yet it showed considerable ingenuity on the part of the builders. The major portion of it consisted of a trench dug into the earth, the dirt walls and floor of which had been covered with adobe plaster. (Pl. 11, *a*, *b*.) The steps leading down into the passage from the house and from the end of the passage into the kiva had been cut in the earth and treated with plaster. No stones were used, either for treads or risers. The covering over the trench consisted of a wooden framework supported by four uprights, two at each end. These were placed against the wall and carried stringers, running the long way of the passage, which supported short cross poles upon which brush, leaves, and a dirt fill rested. The crosspieces at the ends of the framework were much heavier than the intervening ones; in fact, were quite sizable logs. The reason for this feature was that the one at the house end had to carry the weight of the wall where it crossed the trench, while the one over the opening into the kiva had to support a portion of the superstructure. (Fig. 11.) The latter pole was cut somewhat longer than the width of the trench so that it rested upon the top of the small bench encircling the kiva as well as upon the stringers.

The only bit of masonry found in structures of this class was a small wall which had been erected on top of the passage covering at the point where the trench had cut through the kiva walls. The stone filled in the break in the bench so that the sloping timbers of the roof would not slip out of position. The small wall was backed by the dirt fill, above the passage, which prevented its being displaced by the pressure from the superstructure.

The kiva, in spite of its many irregularities, had an average diameter of 21 feet (6.4008 m.). The floor was 7 feet (2.1336 m.) below the present ground level and 6 feet (1.8288 m.) below the surface of the period of occupation. The small encircling bench had an average width of 1 foot (30.48 cm.). Its top was 4 feet (1.2192 m.) above the floor and 2 feet (60.96 cm.) below the old ground level. Indications were that the ceiling of the roof had been approximately 7 feet (2.1336 m.) above the floor. With its covering of brush, earth, and plaster, the superstructure must have risen somewhat above the general ground level, a factor of no little importance from the standpoint of drainage. This structure was much more favorably situated in the latter respect than was the one in house Group 2 of the mesa-top village.

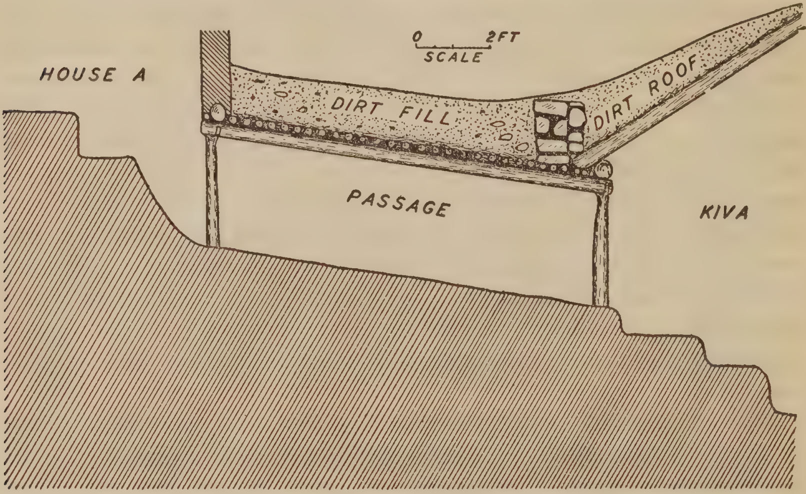


Figure 11.—Detail of construction in passage

The passage was 12 feet (3.6576 m.) long; averaged 2 feet 6 inches (76.2 cm.) in width; and a wall height of 3 feet (91.44 cm.). The first step, at the room end, was 1 foot (30.48 cm.) high and had a tread 1 foot 6 inches (45.72 cm.) in width. The second was quite high, in fact was more of an incline which sloped away to the floor of the passage than a real step. It was almost 3 feet (91.44 cm.) high. At the kiva end of the passage the steps were of more convenient size. The first, above the kiva floor, measured 1 foot 1 inch (33.02 cm.) in height. The tread was 1 foot 6 inches (45.72 cm.) in width. The riser of the second step was but 9 inches (22.86 cm.) in height while its tread was 2 feet (60.96 cm.) in width. The riser of the third step was 10 inches (25.4 cm.) in height. Its top or tread was the floor of the passage.

An unusual feature was uncovered at the northern end of house H where traces of an arbor were found. There were no indications of walls, simply the suggestion that a brush shade or shelter had stood there. One end of the covering probably rested on the housetop while the other was supported by three upright posts. This was the only evidence of such a structure found along the Piedra. In principle it was similar to the sheds in the A group village but had not been as complete or elaborate as the latter. The arbor had been erected over an outdoor fire pit. The culinary activity of several families in the village seems to have taken place in the open, as three other outdoor pits were uncovered. One of the latter was near house L and the other two were in the vicinity of house M.

Not all of the structures in the B village were dwellings. The same situation prevailed here as in the mesa-top village, where it was observed that a number of the buildings had been used for storage purposes. There were not so many of the latter in the B village, in proportion to the number of houses, as there were in the A settlement. D seemed to have been the only storage structure in the main row of houses at the west side of the large circular depression. On the east side there were two which gave every indication of having been used for such a purpose. They were J and K. It did not seem that they could have been for dwelling I alone, but such a thing could have been possible. The lack of such structures near other dwellings suggested that since J and K were quite large they might have served as communal granaries.

House M had an interior storage bin which was interesting in form. It had consisted of an oval pit dug in the floor at the west side of the room. The pit extended underneath the wall and into the earth beyond. While not extremely large, it would have been capable of containing a fairly large supply of corn or beans. On its north-south diameter it measured 3 feet (91.44 cm.) and on the east-west 3 feet 6 inches (1.0668 m.). The average depth was 2 feet (60.96 cm.). When the room was excavated the pit contained charred kernels of corn (no cobs were present) covered over with two large metates. This was the only storage pit of the kind found during the season's work. It will be recalled that a large pit was found in one of the structures on the mesa, but it was in the center of the room and did not extend out under the wall.

One of the inexplicable bits of human handiwork found in the village consisted of a crescent shaped row of stones a little north and west of house M. What its purpose may have been is not known nor was there the slightest suggestion as to what explanation might be given to account for its presence. There were eight river bowlders firmly embedded in the hard-packed soil, their upper sides flush with the surface, with no evidence of any form of construction near them. Their location and the form which they outlined is shown on the map (fig. 7), but beyond calling attention to their existence it is impossible to go.

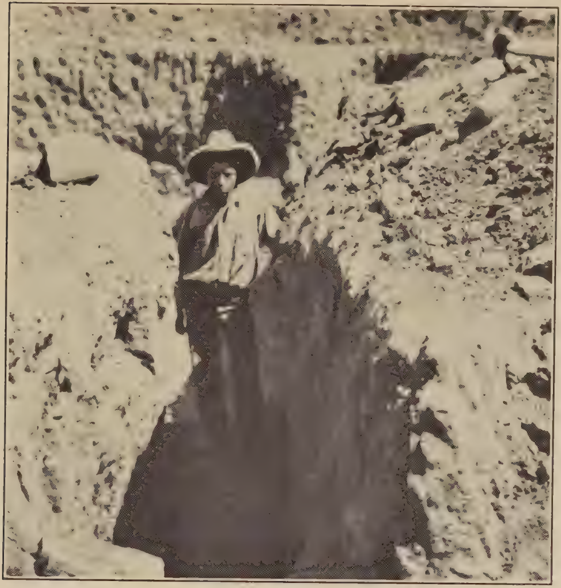
There were two rubbish heaps associated with this village. One was at the northern end on the slope of the bench and the other was at the east side of the village between houses I and L. In neither were there any traces of burials. They had been the refuse mounds only and had not served the secondary purpose of cemeteries. The burial grounds for this village were probably located on the site of the present Mexican church. For obvious reasons it was impossible to make a search there for the graves of former inhabitants of the village. Some of the workmen stated that when the church was erected some earth was removed from the site and several skeletons and pottery vessels were found. Hence, it seems likely that at least some of the village interments had been made there.

The circular depression at the east side of houses M and N had been practically obliterated by the builders of the church. The bricks used in the walls of that edifice were made from adobe dug out of the old pit which remained from the building activities of the ancient occupants of the site. Just a few traces of the ancient puddling pit were in evidence.

Class C Houses

The dwellings of this group were closely allied to those of the preceding stage, the B type houses. The chief distinguishable difference between the actual dwellings of the two classes was lack of a depressed floor in the C structures. The latter were always accompanied by small two-room buildings of crude stone masonry, however, and these structures not only justified the considering of the C units as a separate group but made such a classification essential to a proper understanding of the house-type development.

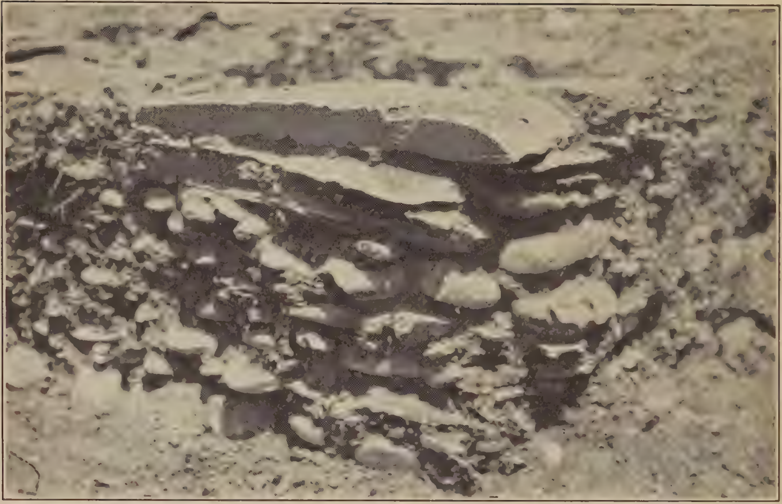
The units in the C group had one of the typical features associated with the A and B classes. Namely, the structures comprising each



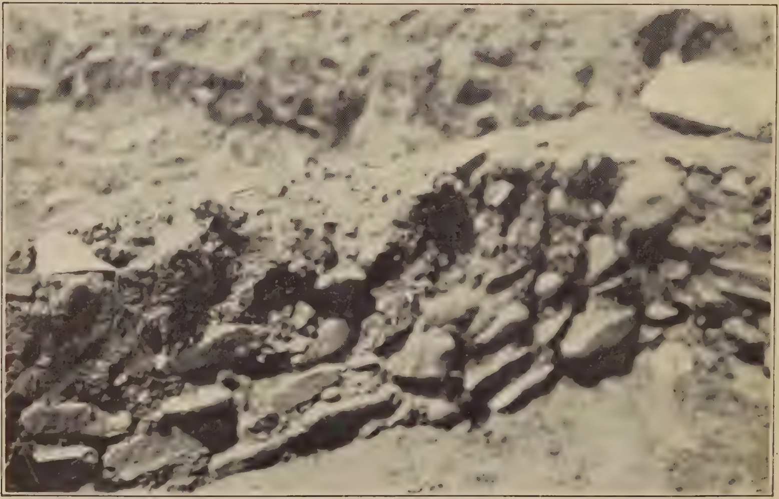
a, Looking toward kiva from house

b, View from kiva

PASSAGE FROM HOUSE A TO KIVA



a, Corner of C–1



b, Portion of C–3 walls

STONE MASONRY IN C UNITS

cluster were erected at one side of or partially surrounding a circular depression, the remains of the adobe pit. The chief difference between the C units and those of the preceding house forms was in the smaller number of structures included in the group. Two or three dwellings constituted the average number of domiciles in the C class. In A and B the average was much higher. Moreover, the C units appeared to have stood alone. Not one instance was observed where two or more had been grouped together to form a village cluster.

The stone structures in the C group present an interesting problem. They were consistently small, had but two rooms, and showed but little variation in size from unit to unit. They seem to have occupied the same relative position in the unit and probably served the same purpose. What the latter may have been is debatable, but the most satisfactory explanation is that they were storage houses. Traces of burned corn were found in two of them. The others offered no clues as to their function. None had a fire pit or other indication of use for dwelling purposes. The cell-like rooms were entirely too small to have served for anything but sleeping quarters and would have been decidedly cramped for that purpose. There was no evidence of lateral doorways and it is very probable that the only means of access was through an opening in the roof.

The walls consisted of masonry, but it was very poor masonry, indeed. Apparently no efforts were made to shape the stones or otherwise prepare them for construction purposes. The builders used a great variety of shapes and sizes. Large river bowlders, long, irregular sandstone slabs, small cubical blocks, all went into the wall with little regard to form. (Pl. 12, *a*, *b*.) The irregularities in the stone were compensated for by the large masses of adobe mortar in which they were laid. It could truthfully be said that the walls were as much mud as stone, a feature in decided contrast to the masonry of later periods, where the stones were so well worked, carefully shaped and fitted that practically no mortar was necessary. Many such walls are standing to-day in spite of the fact that wind and rain long ago removed the plaster from between their courses. At the time when the C houses were occupied building in stone was a rather new departure; the Pueblos were still experimenting with an unfamiliar medium.

Five of the C class units were completely excavated and from the information thus obtained it was possible to identify similar groups and check their outstanding features from surface indications alone. There undoubtedly would have been minor individual differences observable in each had they been cleared of the débris resulting from their own decay, but the general characteristics apparent in the mounds were sufficient to indicate their relationship to the class. All ran so true to type that descriptions of three of them will give the reader all the information essential to a proper knowledge of the form. The three units to be considered in detail include the simplest and the most extensive of the class. As will be noted in the discussion, however, there was not a great amount of difference in any of the three, the main variation being that of the number of dwellings.

UNIT C–1

The smallest unit excavated was that of C–1. (Fig. 12.) This group certainly must have housed but a single family. There was only one room, A, which gave indications of having been used for dwelling purposes. The stone structure was one of those which contained burned corn and gave evidence of having been a two-roomed granary. Room A had been built in the same manner as the B houses already described and a detailed consideration is not necessary because it would consist almost entirely of a repetition of the discussion of the previous house form. The only features of interest in the structure were the wall continuing out from the east end of the building and the abutting of the western end against the stone structure.

The projecting wall had been so constructed as to form a court at the south side of the house. Indications in the débris were that the wall had been approximately the same height as the house, but there was nothing to suggest that there had been additional walls or that the corner formed by the house and the projection had been roofed over. It is possible, of course, that brush was spread across the space to provide shade but no permanent covering was placed there.

The dwelling itself contained no fire pit. The latter was placed outside in such a position that it was fairly well protected from the wind by the house and by the projecting wall forming the inclosed corner at one end of the dwelling.

The end of the stone structure seemed to have served as the west wall of the house as there were no traces of jacal construction to complete that portion of the dwelling. This presents a rather puzzling problem due to the fact that the fallen wall material from the stone building indicated that the latter could not have been more than 4 feet 6 inches (1.3716 m.), or at most 5 feet (1.524 m.) in height. Such a condition would necessarily have left a gap between the roof of the latter and the ceiling of the dwelling. How this was filled in is not known, but it is possible to postulate a series of short sticks so placed that they slanted from the top of the larger building to the roof of the smaller. In fact such an arrangement may well have been used. If such were the case the sticks were probably covered with plaster to complete the construction.

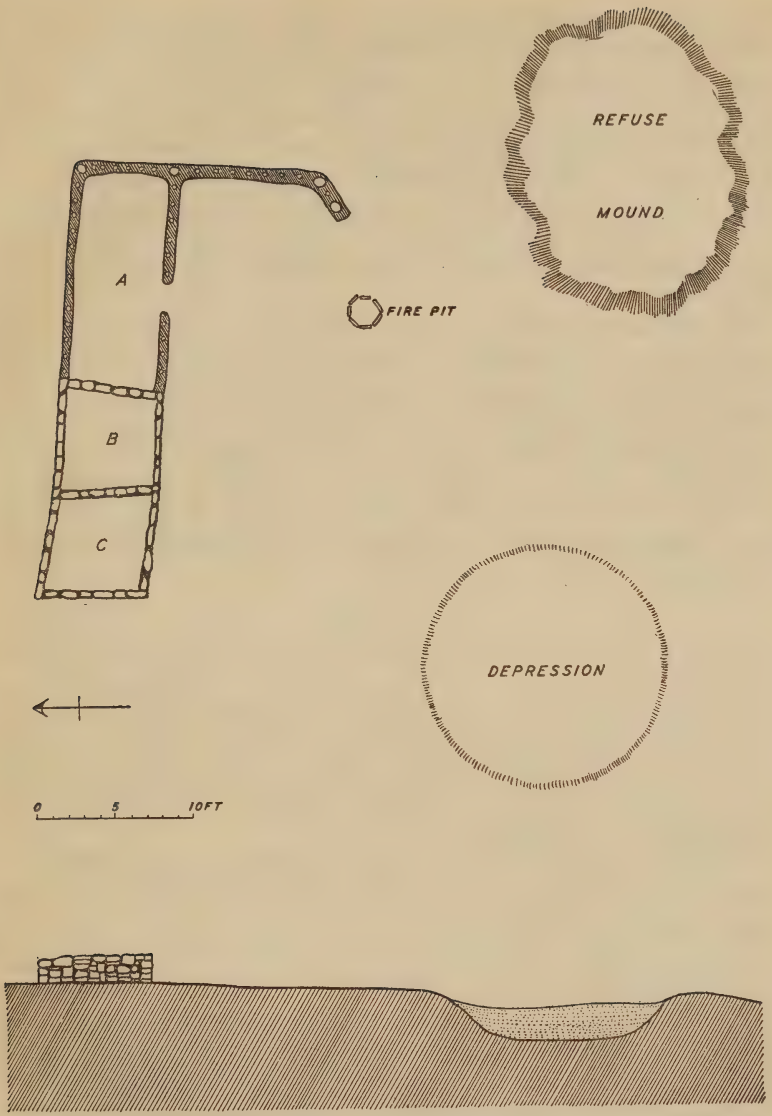


FIGURE 12.—Plan of Unit C–1

The circular depression southwest of the house and granary structures was carefully trenched in an effort to ascertain what secondary function it may have had. The evidence obtained showed clearly that it had served in the capacity of a small reservoir. Signs of standing water were plainly to be seen in the lower part of the fill. The upper portions consisted largely of débris from the house which had washed in after the destruction and abandonment of the latter.

The situation seemed to have been that of a gradually filling pit which furnished the means for conserving water despite the silt and sand which accumulated in its bottom. As mentioned previously in connection with such circular depressions, there was nothing to indicate that the people had seen fit to clean it out from time to time. They may, of course, have done so, but there was no indication of such activity. Such a reservoir would have had considerable value to the occupants of the house because the unit was located on the highest part of the mesa a quarter of a mile (402.34 m.) from the nearest water.

The refuse mound was a short distance from the southeast corner of the house. For the size of the group and number of people who probably lived there it was of proportions such as to suggest a fairly long period of occupancy. It was not deep, averaging approximately 1 foot (30.48 cm.) near the center, but covered quite a large area. No skeletal remains were found in it; in fact, no burials were discovered near this ruin. The mound consisted of the usual refuse, house sweepings, ashes, stone chips and spalls, potsherds, and splintered animal bones.

UNIT C–2

Unit C–2 was larger than the first of this group to be described in that it had one more dwelling. (Fig. 13.) The combination of a jacal structure with one of stone was observed in this group also. The actual relationship existing between the two forms of construction was identical with that described in the preceding example. The similarity was so marked that further consideration of the feature would be superfluous.

The jacal portion of the combination differed slightly from the comparable one in the C–1 unit in that it had an interior fire pit and there was no projecting wall at one end to form a court. Such a wall was not necessary in this case, however, as the additional dwelling, A, served essentially the same purpose.

The remains of house A were so like those in the B village that a detailed description is wholly unnecessary. The structure was undoubtedly of the B form, except that there was no suggestion of a depressed floor. In fact, the latter was on a level with the original surface of the ground; that is, the surface occupied at the time the house was inhabited. Like B, in unit C–2, it had an interior fire pit. In both dwellings the pits were lined with small stone slabs, but there was a difference in their outlines. One was rectangular in form while the other was roughly circular.

The circular depression in this unit was one of the largest observed. It certainly must have been enlarged after all of the adobe

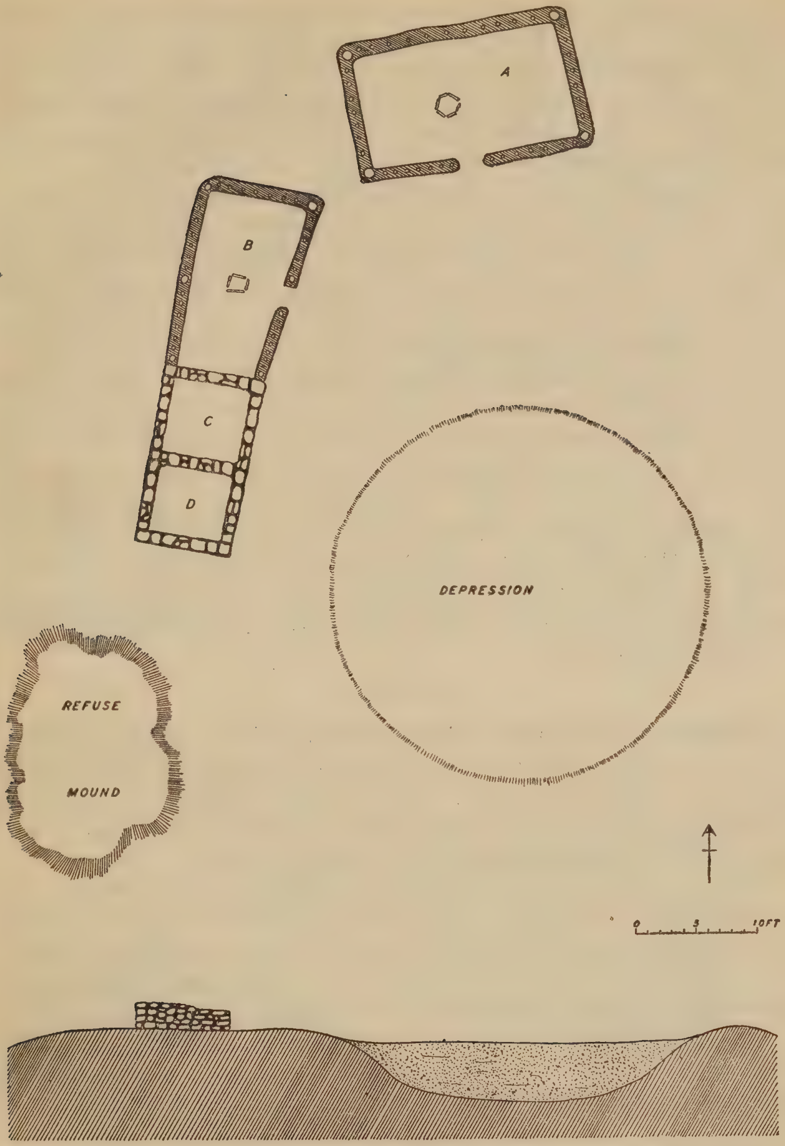


FIGURE 13.—Plan of Unit C–2

needed in the house construction had been removed because the amount of material essential to the buildings was small in comparison to what had actually been taken from the pit. Trenches revealed that it, too, like the one in unit C–1, had served as a reservoir. It is possible that the inhabitants deemed a more extensive tank advisable and consequently enlarged the pit after the need for house material had been satisfied. This unit was also on top of the highest ridge of the mesa at some distance from the streams. With a larger number of people, as shown by the additional dwelling, a greater supply of water would be advantageous, if not absolutely necessary, and such a factor may account for the greater size of the pit.

The refuse mound for the unit was slightly southwest of the end of the stone structure. Its extent was comparable to that of the refuse heap at C–1, but it had a greater depth. The general average of the contents of the two mounds would suggest that both units were occupied approximately the same length of time. The greater content of the C heap was in the proportion which would be expected where there was an additional dwelling or family. The C–2 people, if any of their number died, did not inter in the refuse pile. Again, as at C–1, no skeletons could be found. Perhaps the occupants of the C–1 and C–2 houses were fortunate and had no deaths during the time they lived on the mesa top. On the other hand, it is possible that some members of the groups may have been killed while away from home, in the hunt or in conflict, and have been buried elsewhere. Such speculation is always interesting but of little value from the standpoint of actual facts. The latter, in the present instance, record no burials for C–2.

UNIT C–3

The largest unit excavated in this class was No. 3. (Fig. 14.) There was a difference between it and the other C groups in that the stone structure stood alone, none of the dwellings abutting the granary. This unit had had three houses of the characteristic B form of construction and in addition a storage structure of jacal.

House A was more nearly like the dwellings of the B village than any of those in the C class. This was due to the fact that it alone had had a depressed floor. The pit portion of the house had been shallow, to be sure, but nevertheless was present. The average depth of the floor below the ground level was only 6 inches (15.24 cm.).

House D furnished the one example of stone paving which the summer's investigations revealed. The front wall of the dwelling stood on the very edge of a rather sharp slope which dropped away to the rim of the circular depression. To break the slope immediately in front of the structure, a double row of large cobbles had been laid in adobe mortar in such a manner as to form a low terrace. A somewhat comparable example of the use of a terrace was found by Mr. J. A. Jeancon during his 1925 work 3 miles (4.8279 k.) farther north along the Piedra. The latter, according to notes furnished by Mr. Jeancon, was in connection with a circular dwelling which was thought to have been a tower. This tower was not of the cere-

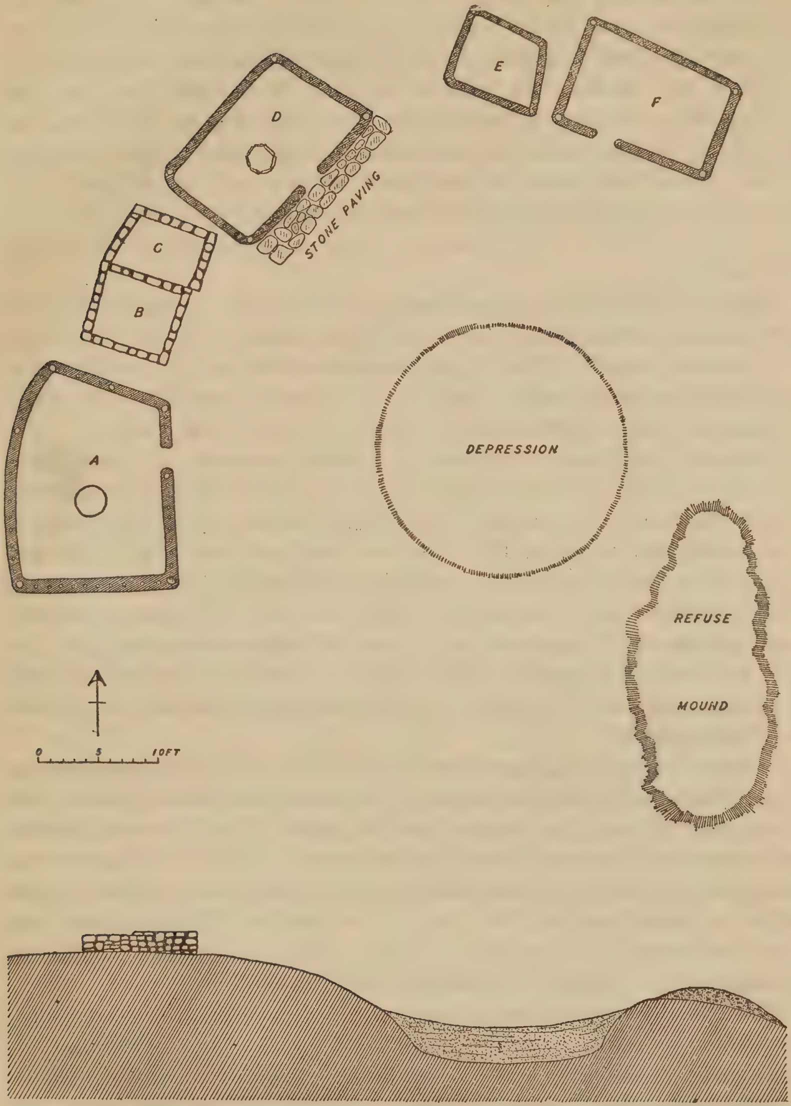

E
F
D
STONE PAVING
C
B
A
DEPRESSION
REFUSE
MOUND
0
5
10FT

FIGURE 14.—Plan of Unit C–3

monial form frequently found associated with one-clan houses of the Pueblo II period in the region farther west, the McElmo district (fig. 1), but clearly a secular building. Mr. Jeancon explains the structure as having been a lookout tower, occupied in turn by individuals or families to whom the duties of watchers had been assigned. It was located at the north end of a jacal village on a high point overlooking the valley. The position which it occupied at the edge of a drop in the mesa top had necessitated, as in the case of house D in the C–3 unit, the building of some sort of terrace.

There was nothing of interest in house F beyond the fact that such a structure had once existed. For some reason there was no fire pit in the room and no indications of an exterior provision for a fire. Near the center of the floor, where such a pit would be, there was a fairly large burned area which suggested that fires had been built directly on the floor, a trait suggested in a few others as well.

Houses A and D had good fire pits. That in A was circular in form and had consisted of a simple pit, the walls of which were lined with adobe plaster. The D pit was also circular in form but had been finished with stone slabs. Both were of average size, their diameters being approximately 2 feet 6 inches (76.2 cm.).

The main difference between the stone structure in this group and those of the C–1 and C–2 units was in the fact that the two rooms had not been erected as a single building, but that room C was subsequent to room B. The east and west walls of C abutted against the north wall of B, showing distinctly that they were of later construction. The joining of the west wall of C and the northwest corner of B had been well done, but the workmanship on the east wall was not so good. There was a miscalculation on the part of the masons and the end of the east wall almost missed the northeast corner of B.

There were many things about the C–3 unit which suggested that it may have represented a stage in the transition between the C and B classes. There is no way of proving such to be the case, but the presence of a depressed floor, the only one in a C group house; the even greater crudity in the stone work, with the second room apparently an afterthought; the lack of connection between jacal and stone construction; suggest a step not quite as advanced as that of the first two, C–1 and C–2, previously discussed.

The circular depression of the unit presented the same features mentioned in connection with those of C–1 and C–2. Over half of the débris which filled it was completely removed in order to make doubly certain that there could be no mistake in the conclusion that it had served as a reservoir. The face of the dirt fill of the unexcavated portion showed beyond doubt that the same conditions had prevailed in this unit as in the others. One point observed in the study of all of the depressions in the C units was that there was no refuse in the pits. The only débris, above the silt and sand strata at the bottom, was material which had washed in after the destruction of the houses. This is a clear indication that the people had definite use for the pits. Otherwise they undoubtedly would have been filled with house refuse. In the C–3 group, for example, it would have been much easier to have dumped the waste matter from the dwellings into the pit than to have deposited it at the side farthest away from the domiciles. Previous to these investigations the writer had always been skeptical over the suggestions that some of the circular depressions had served as reservoirs, but after the evidence obtained through hard and tedious excavation it does not seem possible to escape such a conclusion.

The refuse mound for this unit was located at the southeast side of the depression on the slope of a small ravine. It had the characteristics noted in the other mounds, even to the lack of burials.

Although no burials were discovered during the investigations at C–3, one skeleton was found. The individual had not been buried but had been burned in house A when it was destroyed. The bones were lying on the floor of the room, near the northern wall, in positions indicating considerable distortion of the body. Most of the small bones had been entirely consumed by the flames and the skull was in a very poor state of preservation. It was not possible to tell whether the individual, an adult, had lost his life in the fire, whether he had been wounded and thus trapped because of his inability to escape, or whether death had preceded the destruction of the house. Nothing is known, of course, of the practices of the Indians of that period and it has been suggested that on occasions, like the Navaho, they burned the house in which a person had died. In view of the elaborate burial customs of the Pueblos and considering the attitude of the modern descendants of the old people it does not seem likely that they followed that practice. The probabilities are that the person perished as the result of some factor which was closely associated with the destruction of the dwelling, but how or under what conditions it is impossible to tell.

House Type Summary and Conclusions

The characteristic features of the house forms of the three groups discussed in the preceding pages may be briefly summarized.

Features common to all were: Jacal walls; flat roofs with smoke holes near the center; lateral doorways; the grouping of houses around the pit from which the earth used in the plaster construction was taken, such combinations being considered to represent a unit, possibly a single clan group. Some of the dwellings had interior fire pits, while others did not.

Class A dwellings were, with one exception, one-roomed; quadrilateral in form; had a pole and brush superstructure erected over a pit, the bottom of which was the floor of the house. The roof and sloping side walls were supported by a framework of logs which rested on upright posts set in the floor some distance from the corners. The wall poles were held in position against the sides of the floor depression by heavy base logs. The wooden framework was covered with a thick layer of adobe mud applied to the exterior. The inside walls were not plastered and the poles were covered only by such of the adobe as worked its way through between the timbers and then was smoothed down. The houses ranged from 4 to 12 in each unit.

Class B dwellings approached more closely to the rectangular form and had perpendicular walls in which the main supporting framework was incorporated. The base ends of the wall poles were placed in shallow, narrow trenches, where they were held in position either by quantities of tamped adobe clay or wedged-in stones. The poles were completely incased in the mud plaster which constituted a greater part of the wall material. The heavy roof timbers crossed the short way of the room instead of paralleling the long walls. The pit portion of the structure was much shallower, and as a consequence the floor was not as far below the ground level as in the A domiciles.

The class C houses were closely allied to those of the B group, their chief and characteristic difference being the lack of a depressed floor or pit. Associated with the C houses were small two-room stone structures which seem to have been granaries. Four of the five units excavated showed a combination of stone and jacal buildings, one abutting another, while in the fifth they stood as separate and distinct structures. The masonry of the stone buildings was extremely crude. No attempt was made to dress the stones, and discrepancies in size and shape were compensated for by the use of large quantities of mud mortar. There were fewer dwellings per unit in this group than in the preceding ones and several units were not combined to form a single village.

In the introduction to the subject of house remains it was stated that the three forms were thought to have developed in the order listed. This conclusion is based on several distinct bits of evidence. That the C form was subsequent to the A was definitely shown in the superposition of remains at house Group 3 in the A village on the mesa top. This was the only actual stratigraphic evidence found during the 1928 work, but Mr. Jeancon noted a similar condition in his 1925 investigations, previously referred to. His notes on the work, kindly loaned for comparative purposes, give clear indications that the small houses of stone which he excavated rested upon the remains of jacal structures. There was still another important factor in the 1928 results, however, which shows a later development for the C group. This was in connection with pottery forms. Inasmuch as ceramics are discussed at some length in a following section of this paper, an extensive consideration of them is not germane to the present problem, but to make clear the chronological sequence of the two houses it is necessary to mention briefly one form, the cooking jars. One of the outstanding characteristics of the latter in Pueblo II and following periods was the indented corrugation of their exterior surfaces. The comparable pots in the Pueblo I period had no indentations, merely plain coils around their necks. That the latter preceded the former has been shown by stratigraphic evidence at many places in the Southwest. The same is true for the question of the relationship of the pottery forms to the periods named. The factor of significance in the Piedra jacal ruins was that the only potsherds from vessels of the indented corrugated ware were found in the remains of C houses. Not a single fragment of the type was observed in the vast amount of pottery and potsherds from the A sites. With two such conclusive bits of evidence, superposition of house remains and pottery specimens with an established sequence, the later horizon for the Class C dwellings is clearly demonstrated.

The problem of the relationship existing between the B houses and the other forms is somewhat more difficult. It can be answered only by a careful interpretation of the conditions under which they were found. There was no clear-cut evidence of the kind just discussed for the A and C groups. Investigation showed that two of the A class houses were associated and contemporary with the B structures in the village at the foot of the southern end of Stollsteimer Mesa. None of the B group was found on the mesa top during the 1928 work, but the remains of three were uncovered in the preliminary investigations of 1923 and 1924.[46] A thorough inspection of their remains showed that they unquestionably were contemporary with the A structures comprising the major part of the settlement.

The dwellings of the C group were found to be similar to those of the B class; in fact, with some minor modifications, were so similar to them that they might be considered as a single form were it not for the association of the C form with stone structures. The situation found to exist, then, was that A and B forms occurred together, while B and C were closely related. A was not found in combination with C but was shown to have preceded it. Furthermore, none of the B houses contained any of the indented corrugated potsherds, although they did yield ax heads, a form of implement associated with C but not found in any of the A structures. On such grounds it seems quite evident that the B class occupied the intermediate position and forms A, B, and C developed in the order named.

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[46] Roberts, 1925, p. 41.

On the basis of the foregoing it is possible to trace quite conclusively the growth and change in house types in the Piedra district. The earliest form of which there is evidence, the A, shows some resemblances to late Basket Maker houses in the sloping side walls, flat roof, and interior support posts, but its general features are sufficient to set it apart as representative of a different horizon. The B and C classes are distinctly different from the dwellings of the former culture and may be considered as showing definite Pueblo characteristics.

Although the house forms discussed would tend to show that there was an abrupt change from support posts set out from the wall to those incorporated in it, such was not the case. During the work of 1922, and also Mr. Jeancon's 1925 investigations, rectangular structures were found in which the main roof posts had been set against but not included in the walls.[47]

The development of the perpendicular walled building was a feature of decided importance because it made possible the grouping of houses together to form a single building. This permitted considerable economy in material and labor because one wall could serve for two buildings. In this connection there is a point of considerable significance which has already been mentioned but which should again be stressed, namely, that in this district, at least, the rectangular form of structure was developed first and then the step toward consolidating a number of them into a single building was taken. A similar feature was observed in the late Basket Maker village in the Chaco Canyon in which connection it was pointed out that contrary to common belief rectangular structures in the Chaco preceded and made possible the compact house type instead of resulting from efforts to join circular or oval dwellings together in a single structure.[48] It is interesting to note that the one-roomed dwellings prevailed for some time after the feasibility of contiguous grouping was discovered. No doubt the tendency to conservatism was just as operative in the acceptance of the development of such a feature as it had been in the shift from A to B construction methods.

Just how the building of the small masonry structures began is not known. Late Basket Maker ruins in some localities show occasional bits of wall with horizontally laid stones and it is possible that the idea survived from that period. On the other hand, it may have been that the occasional use of large bowlders here and there in a wall which was predominantly of adobe may have suggested that more stone and less mud would make a good wall. Regardless of how it developed, in the course of time there appeared a combination of jacal houses with granaries of stone construction, and eventually, although the present study does not show it, the jacal structures disappeared, the granaries were enlarged, more rooms were added, and dwellings of stone became the rule. The unit-type houses on the lower Chimney Rock Mesa represent the latter stage. There seems to be considerable probability that the jacal structures persisted longer in the Piedra district than in some other sections of the Southwest where they are found to have existed. This was possibly due to the fact that there was an abundance of timber for use in such structures as well as to the difficulty of obtaining suitable building stone on the lower benches along the river. On the upper mesas where there was an outcropping of rock it would have been a comparatively simple task to secure stone for use in walls.

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[47] Jeancon and Roberts, 1923, p. 31.

[48] Roberts, 1929, p. 147.

There seems to be no question but what the house-group units with their row of one-roomed dwellings grouped about a depression definitely foreshadowed the characteristic unit type of the Pueblo II period. All that was necessary to the development of the latter was the straightening of the house row and the pushing of the structures together, so to speak. The elimination of the crescent shape, which was due to the erection of houses around the rim of the pit where the adobe was puddled, was a natural development in the shift to stone construction and the building of contiguous rooms. A straight wall of stone, comparatively speaking, would be easier to lay than a curved one, hence its development. The B village went even further and furnished the precursor of the underground passage from house to kiva, a feature which is such an integral part of the Pueblo II unit-house complex. The depression of the house-group units became, in the later stone structures, the kiva, another feature which was being developed in the stage represented along the Piedra.

The depressions, it will be recalled, were found to have been used for reservoirs, dance courts, and in two instances for kivas.

The apparent lack of kivas in so many of the units raises an interesting question. Was the feature fully established at that time or was it still in the process of development? Because of the many indications of the instability of the period, that there was a plasticity in numerous parts of the culture, it seems logical to suppose that the specialized ceremonial room was still in an embryonic state. For years it has been considered axiomatic that the absence of a kiva in a Pueblo ruin indicated a temporary habitation, perhaps a farming settlement. That such was true in the Piedra villages seems improbable. The evidences of continued occupation of the sites are too marked to warrant the belief that they were but temporary communities. The fact that in some instances a kiva was present also argues against such conclusions. Furthermore, there are no sites in the region which could be construed as being the remains of the permanent villages to which the residents withdrew at the end of the harvest season. To postulate the location of permanent dwellings 60 or 70 miles (96.561 or 112.654 k.) down the river is going too far afield. The presence of storage facilities shows that the harvest was not carried away, and it does not seem probable that they left their food supply behind at a time when it would be most needed. It seems more in keeping with the condition of the period to believe that the kiva had not yet become a component part of the Pueblo complex; that it was still in its incipient stage. The influx of new peoples, the commingling of traits, no doubt had a marked effect on this as well as other features of the culture.

The development of the kiva was considered at some length in the report on the Chaco Canyon Late Basket Maker village. The discussion presented the suggestion that the lesser ceremonial observances of that period were held in the dwellings and that the small-clan kivas of the later Pueblo periods represented in a somewhat modified form the old, original dwelling which survived because of the tenacity with which primitive peoples cling to matters pertaining to their religious customs.[49] This would indicate a decided Basket Maker influence on the religious practices of the later peoples, but one which probably did not assert itself immediately in the Pueblo I period. It possibly remained dormant until conditions became more stabilized. Then because of the vast difference between the type of dwelling in vogue and that which had been the scene of the simple family ceremonies in the older horizon, it was found necessary to construct chambers embodying the essential features of the old domiciles. Perhaps it was at this point that the custom of having but one ceremonial chamber to a group, the clan, appeared. Due to the disturbed state of the period it is quite reasonable to suppose that some of the clan units had structures for ceremonial observances while others did not. Possibly one to a village was thought sufficient, then as the culture unfolded old beliefs began to assert themselves until the ultimate end was that each clan constructed and maintained its own ceremonial chamber. Under such circumstances an occasional unit without a kiva would not be surprising, as a matter of fact might well be expected.

The kiva in the B village showed in its type of roof construction a distinct survival of the superstructure of the Basket Maker III houses. It was so like the coverings of the Chaco Canyon houses of that period that it might just as well have been found there as along the Piedra. This feature was somewhat disappointing when first uncovered, because it had been hoped that some clue would be found to suggest the origin of the cribbed type of kiva roof so characteristic of later Pueblo periods, but its demonstration of the survival of the preceding period's form of construction is of value. It shows that the cribbed roof was not an immediate development of the Pueblo peoples.

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[49] Roberts, 1929, pp. 81–90.

The designations given the various forms of house remains in this paper are different from those suggested by Mr. Jeancon in his first report on the work of the Colorado institutions. For the benefit of the student and those who are familiar with the earlier paper, it has been deemed advisable to correlate the two. Mr. Jeancon's classification was only a tentative one, based on rather meager information for the older forms, but with the knowledge gained in the recent investigations it may be clarified and fitted into the chronological sequence for southwestern sites which is at present followed by the archeologists working in the area. Mr. Jeancon's classification was as follows:

"First. Pit houses: These are houses which were semisubterranean with the plastering applied to the native earth and with a double slant roof. There are thousands of this type scattered over Archuleta County.

"Second. Pit houses with cobblestone walls. While these are not in a class by themselves they plainly indicate a step in the sequence of house building.

"Third. Pit houses with cobblestone walls and the paving of floors with slabs and cobbles. The first use of horizontal slabs laid above the cobblestone walls. Here is probably where the first type of flat roof occurred.

"Fourth. Single rooms, all above the ground, without any excavation, using a few cobbles for the foundation and horizontally laid slabs of stone above these for the remainder of the walls.

"Fifth. Small groups of from three to six or eight rooms built in a similar manner to those of group 4.

"Sixth. The large pueblo or concentration of several houses of the type of group 5."[50]

The first type undoubtedly corresponds to the A dwellings. It seems unlikely that any of the structures had a double slant roof. The traces of sloping poles found in the earlier work were no doubt the remains of the slanting walls from a superstructure similar to that of the A houses. The remains examined in 1921 were of houses which had been more nearly consumed by the fire which destroyed them than had those of the 1928 investigations. Hence it is highly probable that all indications of the flat portion of the roof had been obliterated. The other features of the first type houses correspond and agree with those of the A class.

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[50] Jeancon, 1922, pp. 5–6.

The second, third, and fourth stages represent variations of the stone structures of the C class. The writer reviewed the situation in such remains during the 1928 season and found that in practically every case they had been associated with some form of jacal construction.

The fifth type is that of the unit houses or one-clan structures which are so characteristic of the main phase of the Pueblo II period.

The sixth type, the large pueblo, is the typical Pueblo III village or large community house.

No example of the B houses was found during the earlier investigations, but such a condition is not surprising in view of the fact that only a small amount of work was done in the so-called pit house or jacal ruins. The A and B dwellings are definitely Pueblo I in their horizon. The class C structures probably mark the end of the first period and the beginning of Pueblo II. Consequently, as stated in the introduction, the Piedra district clearly shows that it was occupied during Pueblo I, II, and III.

DISTRIBUTION OF HOUSE FORMS

The remains of jacal structures comparable to those described in preceding paragraphs are to be found in widely scattered sections of the Southwest. Those in closest proximity to the Piedra district might be considered, in general, as belonging to the same regional group. On both sides of the San Juan River, east from the confluence with the Piedra, for a distance of 25 miles (40.235 k.), are almost countless numbers of mounds and depressions indicating some form of the jacal unit cluster. Along each tributary canyon for a distance of several miles from the main stream are additional house sites belonging in the same category. The region east and west of the San Juan extending down into New Mexico, the Frances, Burns, and Governador Canyons, contains similar remains. Although there has been no excavation in the vast majority of them, surface indications are sufficient to show their general character.

West from Arboles, in the vicinity of Allison (fig. 2), there are many jacal sites. The latter fall into two general groups, one located along the Middle Mesa, skirting the Colorado-New Mexico boundary line, the other on the north side of the valley following the tops of the lower benches which slope down from the Piedra Peaks still farther north and east. No indications of ruins were found on the floor of the valley, although there may have been isolated units there at one time. This is one of the best agricultural sections in southwestern Colorado, and because of the extensive cultivation which the valley has undergone any traces of ancient occupation which may have remained until recent times have been obliterated.

On both sides of Spring Creek, still farther west, are ruin sites. They extend down the stream to its juncture with Pine River just below the little town of La Boca.

Pine River is the next large tributary of the San Juan to the west of the Piedra. The district was studied and several ruin sites examined a number of years ago by Dr. Albert B. Reagan. In describing one of the house types which he found Reagan wrote:

> They were made of poles stood apparently in upright position and adobe mortar plastered on both sides of these to make the walls. In several other instances a form seems to have been made of poles and the adobe poured into it and let dry. The adobe walls were all made by the puddling process. The roofs were made of cedar poles over which brush and probably rushes were placed and on top of this adobe mud was placed. Many of the ruins were destroyed by fire as is attested by the adobe being burned to a brick constituency.[51]

From the description in the foregoing paragraph it seems quite evident that there was a form of the B type dwelling in the Pine River Valley. The presence of walls made by pouring adobe mud into frames made from poles is unique as far as the northeastern San Juan region is concerned and it is debatable that such actually occurred. Careful inspection of many sites in the valley failed to reveal any such evidence to the writer. It is of interest to note that in this section, also, the houses had been destroyed by fire.

Along the Animas River, still farther west, are additional sites revealing remains of the characteristic jacal ruins. They occur sporadically from just north of the city of Durango down as far as the New Mexico line. From that point on south they are more numerous. It is only a comparatively short distance from the State line to the large group of ruins at and in the vicinity of Aztec, N. Mex., the subcenter of the eastern San Juan area discussed in the introduction to this paper.

The most interesting district, from the standpoint of early house remains, west of the Piedra is that of the La Plata. (Fig. 1.) In that region are vast numbers of jacal ruins and it was the investigations of Mr. Earl Morris in those remains that first called attention to the type. His findings are of especial value as a check on the results obtained by the recent excavations along the Piedra. It is rather curious that the majority of the ruins examined by Mr. Morris showed long rows of contiguous chambers, the realization of the many-roomed structure, but none of the isolated single-roomed dwellings such as constituted the major part of the Piedra phase.

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[51] Reagan, A. B., 1919, p. 171.

Mr. Morris summarized the characteristics of the remains which he uncovered as follows:

> The inhabitants of the mesas were an agricultural people whose domiciles were one-storied aggregations of cell-like chambers, usually grouped to form a rectangle. Generally speaking, the rooms extended down into the earth, and with few exceptions the sections of the walls above ground were constructed of upright poles covered with plaster.[52]

A more complete and detailed description of one of the houses which he excavated shows unquestionably that it was of the type which has been called the Class B dwelling.

> Shallow trenches were dug where it was desired to place the walls. In these poles averaging about 4 inches (10.16 cm.) in diameter were set side by side, and held upright by stones wedged into the trenches on both sides of their butts. The poles were then coated with mud till they were almost, if not quite, hidden, and a strong wall superficially resembling one of adobe was formed. It is probable that the roof consisted of beams, twigs, and bark covered with clay. The presence of the charred stumps of the poles still resting in the trenches between the rows of stones, and the large quantities of plaster burned to a bricklike consistency, smooth on one surface and bearing upon the other the distinct imprints of poles, twigs, and knots, with the fingerprints of the primitive masons, shows these mesa dwellings to have been the structural analogues of the modern post houses of the Mexicans.[53]

The B form of dwelling was not the only one represented in the La Plata district, for, judging from Mr. Morris's report, there was a variation of the C style. In the description of one group of ruins it is observed that—

> The more easterly of these structures was built entirely of poles and mud, while parts of the other are of stone. There is not enough fallen masonry to indicate that the stone sections of the walls were more than 3 or 4 feet (91.44 cm. or 1.2192 m.) in height.[54]

One feature found in many of the house remains of this region was not encountered in any of the sites along the Piedra. The La Plata peoples frequently lined the walls of the excavated portion of the dwelling with large stone slabs. This led to the adoption of the term "slabhouses," and many of the older reports on southwestern archeology refer to the Slabhouse people. Such a designation was found to be confusing, however, as later investigations revealed the fact that the late Basket Makers had a similar constructional feature in their houses, and the name slabhouse might indicate a dwelling belonging to one or the other of two different peoples and periods. The use of the word has been discontinued at the present time, although it is recognized that slab-lined pits may be the remains either of Basket Maker or early Pueblo structures. The presence of slabs is not an essential characteristic, however, of the dwellings of either period, as many of the houses did not have them.

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[52] Morris, 1919 b, p. 202.

[53] Morris, 1919 b, p. 187.

[54] Morris, 1919 b, p. 188.

The absence of slab-lined pits in the houses along the Piedra may be attributed to an environmental factor rather than to any outstanding cultural difference between the people of that district and those of the La Plata region. Nowhere in the immediate vicinity of the Piedra settlements was there a sufficient outcropping of stone suitable to an extensive use of slabs in construction work. Occasional large slabs could be obtained, but it would have been difficult to secure any great number of them without transporting the material a considerable distance. As a matter of fact, the large slabs used to cover the doorways in the houses must have represented a considerable amount of effort on the part of the builders.

The house remains of the La Plata in many instances exhibited a feature which has been commented upon in the discussion of both the Piedra and Pine River Valley ruins, namely, destruction by fire. With reference to this condition in one of the ruins which he examined, Mr. Morris wrote:

> Fire destroyed the building and its contents. To judge from the large quantities of corn and the many vessels sitting about in the rooms, the conflagration must have been sudden and catastrophic. Whether it started from wind-fanned sparks or was caused by lightning or by enemies is purely a matter of conjecture.[55]

There is probably a factor of some significance in the widespread evidence of the burning of buildings. That it was sudden and unexpected is shown by the destruction of food and personal property. As Mr. Morris points out, the cause can only be suggested by speculation, but it seems unlikely that fortuitous sparks were responsible for such widespread conflagrations, especially the blotting out of entire villages. The occasional burning of a single house might be expected, but not that of whole communities. The writer is more inclined to think that, in most cases, conflict was responsible. The buildings may not have been fired in every instance by enemies, but by the owners who in precipitate flight after a defeat sought to destroy all that they could not carry with them, and thus prevent its falling into the hands of the plunderers. It seems more likely that at this particular time there was intervillage, possibly interregional, strife growing out of the commingling of Pueblo and Basket Maker peoples, with the attendant transition from one form of culture to another, than that nomadic groups had begun their depredations. This would in large measure explain the almost countless remains of burned villages scattered throughout the eastern San

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[55] Morris, 1919 b, p. 191.

Juan area. It may well have been that after the attackers had moved on the survivors from a destroyed village returned to the site of their former homes and built anew. The changes and improvements in house construction may have arisen from just such happenings.

The absence of kivas in villages of this period was also noted in the La Plata region. At the conclusion of his earlier work in the area Mr. Morris stated that no kiva had been found in or connected with a jacal dwelling,[56] but since that time he has discovered such chambers. He did ascertain, however, that some of the circular depressions gave evidence of having been large circular pit rooms, and suggested that they may have represented the prototype of the kiva. There is nothing to show that such was the case, but the writer suspects that there was something analogous between the latter and the so-called dance plaza, which was uncovered by Mr. Jeancon along the Piedra. The explanation for both may possibly be drawn from the late Basket Maker village in the Chaco Canyon, where the remains of a large circular structure suggestive of the early type of the great kivas of the Chaco cultures was found.[57] The latter are distinct from the smaller clan kivas discussed in an earlier paragraph, and are believed to have been the structures in which the major ceremonies of the entire village were performed, as contrasted with the minor clan observances held in the small kivas which represented the old, original dwelling. If the suggestion that the large structure in the Chaco was an example of the forerunner of the great kivas is correct, there should be some evidence of the existence of a comparable feature in the intervening horizons. Such evidence is possibly to be found in the large circular remains uncovered by Morris and Jeancon. Thus far there is nothing conclusive about the available data, and the suggestion is offered as an explanation and not as a demonstrated fact.

The investigations by Morris developed, in addition to the forms of house construction, other features which show that there was a definite relationship to the cultural horizon represented by the Piedra jacal remains. One of the most outstanding of the latter is in the ceramic industry. This factor belongs to the consideration of pottery, however, and will be reserved for that section of the report. Another point of significance is that the skeletal remains in the refuse mounds accompanying the villages referred to showed an occipital deformation of the skull which is a condition comparable to most of the human remains found in the Piedra district.

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[56] Morris, 1919 b, p. 202.

[57] Roberts, 1929, pp. 80–81, 90. For an extensive treatment of great kivas and their possible significance in ruins belonging to the Chaco Cultures see Morris (1921) and Kidder (1924, pp. 50–51).

Morris mentions that 11 undeformed skulls were found at a site in Long Hollow, but these were unquestionably from a late Basket Maker village and are not to be confused with those from the Pueblo I ruins.

Before passing to the consideration of comparable examples of house construction in still other districts of the southwestern area the La Plata situation may briefly be summed up by saying that in the ruins described by Morris are to be found variations of the B and C class of dwellings of the Piedra region; that the structure of many contiguous rooms prevailed, while the isolated, single dwellings were missing. The sites show the same relation of houses to depressions, although none of the latter are believed by Morris to have been reservoirs.

The closest approximations to the A type dwellings thus far reported from the Southwest were found at Beaver, Willard, and Paragonah, in southeastern Utah, by Mr. N. M. Judd, who uncovered the remains of rather crude structures belonging to an early Pueblo horizon. These houses did not bear a striking similarity to the ones in southwestern Colorado in many of their details, but they did have the sloping-walled, flat-roofed superstructure supported on four posts. Mr. Judd's description of the type as he found it at Willard follows:

> The four upright and perhaps notched posts supported crosspieces upon which lay lighter poles and split timbers. Over these were spread, in succession, layers of willows, reeds, or grass, and mud, the latter fitting closely about the two former and retaining their impressions perfectly after fire or natural decay had removed all other traces of the vegetable matter. The relatively small, flat portion of the roof between the uprights probably contained a smoke vent for the fireplace directly beneath.
>
> That the sides of this lodge sloped from the ground to the crosspieces supported by the four central posts seems obvious from close examination of the floor. About the fire pit and within the square formed by the four pillars the earth had been tramped hard and smooth through constant use. Elsewhere the floor was traceable in direct proportion to the distance from its center, and in no place could it be followed with certainty more than 7 feet (2.1336 m.) from the rim of the fireplace. Further, the two pits previously described were so situated as to be well under a sloping roof, and therefore of least inconvenience to the inhabitants of the hut. Although no marks were found which might indicate the former resting place of inclining wall timbers, the mere fact that the floor, so distinct in the middle, became less plain toward its borders, suggests that this ancient structure was circular in ground plan, and in outward appearance not unlike the earth lodges of certain western tribes, or, for example, the familiar winter hogan of the Navaho.[58]

Houses of this type were grouped in small communities but stood as separate units. They seem to have been followed by rectangular structures of adobe, without timber reinforcements in the walls, which formed single-roomed dwellings or were combined into buildings of several rooms, a stage which in its broadest aspects corresponds to the general features of the B period along the Piedra. There was one factor in such house groups that is of particular interest and that was the association with the adobe buildings of an arbor or court shelter in which the cooking or other household tasks were performed.[59] It will be recalled that a similar bit of construction was found at the northern end of the main house row in the B village on the Piedra. Mr. Judd observes, in another part of the same report, that all of the cooking in the adobe villages was done in the open or under such arborlike structures. The many outdoor fire pits in the southern Colorado villages suggest that a somewhat similar condition prevailed there, although it was probably not as extensively practiced as in the Utah communities where none of the houses had an interior fire pit, excepting, of course, the earlier jacal-like domiciles.

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[58] Judd, N. M., 1926 b, p. 8.

The remains of a culture which suggests some affiliations with that found by Judd in Utah were developed along the Muddy and Virgin Valleys in southeastern Nevada by M. R. Harrington. Some of the dwellings in his Pueblo Grande de Nevada appear to have had a form of the jacal construction very similar to that found by Judd. In one there were indications that the pole-and-mud walls had sloped inward, and it is quite possible that it may have been a form analogous to the A houses, but from the available information it is difficult to ascertain its exact status. One feature about the Nevada settlement which is strikingly reminiscent of the La Plata and Piedra villages is that the houses, of the many-roomed variety, were grouped about circular courtyards.[60] Harrington also observes that most of the rectangular rooms with solidly built walls were so small that they could have been used only as granaries. This suggests a condition similar to that of the stone structures in the C group.[61]

One other characteristic in the Nevada village of interest to this study is that there appeared to have been a use of arborlike shelters such as was reported by Judd and as found in the B village on the Piedra. This use of open structures was apparently a rather common practice in the early Pueblo periods.

The position of Pueblo Grande in the chronology of the Southwest has been in some dispute, but it seems to the writer that it began in Pueblo I and continued into early Pueblo II. There are clear evidences of late Basket Maker survivals in some of the remains, but such may be expected in a site on the outlying margins of a culture area in a period which witnessed the mixing of two peoples and the development of a new culture out of an older one.

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[59] Judd, N. M., 1926 b, p. 29.

[60] Harrington, M. R., 1927 b, p. 268.

[61] Harrington, M. R., 1927 b, p. 267.

To conclude, it may be stated that the three house forms studied in the Piedra district show certain general similarities to types in other regions. The A dwellings have no close counterparts, but slightly analogous structures have been found in the region north of the Rio Colorado, especially at Willard, Beaver, and Paragonah, Utah; and in the Muddy River Valley in southeastern Nevada. The B dwellings may be duplicated in the Pine River Valley and variations of both the B and C forms are to be found in abundance in the La Plata district. A form of structure comparable to the stone portions of the C units was noted in the Nevada section. On the basis of such comparisons it would appear that the jacal houses described in detail in this report represent an Early Pueblo phase which is typical of the northeastern San Juan area, but which have in general only a superficial similarity to the more widely scattered buildings of that cultural horizon.

LESSER OBJECTS OF MATERIAL CULTURE

A major element, the dwellings, in the material culture of the early inhabitants of the Stollsteimer Mesa section of the Piedra district has been discussed in preceding pages, but a number of smaller factors which played an equally important rôle in the day-to-day life still remain to be considered. It is not possible to give an accurate, detailed picture of this phase of the culture because excavations in sites such as those along the Piedra yield specimens of one group only, those made from imperishable substances. There undoubtedly were many objects which, because of inherent qualities in the materials from which they were fashioned, have not survived. Even though they may have escaped destruction in the fires which consumed the houses, they long since have decayed and become mixed with the earth which covered them.

Although it may seem to be needless repetition, the fact that objects obtained from investigations of an archeological site located in the open, exposed to all the vagaries of the weather, generally tell but half a story is so frequently forgotten or disregarded that it should again be emphasized. Too many times a certain stage or culture is thought of only in the terms of stone tools and pottery, and the other elements which contributed in no small degree to making the complex a rounded whole are entirely ignored. It is true that a thing which is not present can not be described, but that such probably did exist must not be forgotten.

The group of objects which is not represented in the specimens collected from the Piedra sites but which were an important part of the material culture of the region includes baskets, sandals, other articles of dress, textiles, wooden implements, and weapons. That the people made and used baskets is shown by the impressions on the bottoms of many pottery containers; that they had planting and digging sticks may be assumed from the fact that they cultivated corn and beans; the existence of the bow and arrow is indicated by the many unusually fine arrowheads recovered; that their axes and mauls were handled is suggested by the presence of grooves for their hafting; that the people had clothing may be inferred from the finding of such objects in cave sites of the period, in other sections of the area, where dry sand has preserved them; but, with the exception of a single small fragment of charred basketry, not one scrap of the actual material in this group has come down to the present day in the Piedra district. All that remains upon which an appreciation of the skill and development of the people in the lesser factors of their material culture can be based are the pottery objects, bone and stone implements, articles of personal adornment made from stone and shell, and small fossils and curiously shaped stones which were collected and saved for unknown reasons.

POTTERY

Among the objects left by a prehistoric people one of the most important upon which the archeologist can base his studies is pottery. The material from which the vessels were made, coupled with the fact that they were fixed in form by being baked in a fire, makes for a permanence which is lacking in the vast majority of the objects fashioned by man for use in his daily life. The firing of the bowls and jars also made for a brittleness, a liability to breakage, which in itself is of value to the student of early cultures. The fact that many were broken, that there was the necessity for constant replacing of the damaged pieces by new ones, provided a quantity of material that is invaluable. Each vessel made presented a new problem to the potter and with the solution of each one more step was taken toward a mastery of technique. Changes appeared from time to time in the shape, ornamentation, and composition, and these changes were faithfully recorded in the objects themselves. From this record it is possible to note the cultural growth of a people, the development of their artistic ideas, and the progress of their craftsmanship.

From the standpoint of early Pueblo pottery the Piedra sites furnished information of considerable value. The large number of specimens obtained show clearly that the ceramic industry was in the full exuberance of its youth, the hands and fancy of the potters were unhampered by convention, by long-established style and technique, there was a plasticity of shape and decoration, a multiplicity of invention and trying out of new methods not to be equaled in any following period. True pottery first made its appearance in the late Basket Maker horizon but did not assume a rôle of major importance until the Pueblo I period, when it definitely usurped the place held by basketry in earlier stages of the prehistoric sedentary southwestern cultures. It was pointed out in the general introduction to this report that unfired clay containers were probably known in the closing days of the main Basket Makers, period II, but the ceramic idea did not become fully developed until the following stage. The complete realization of its possibilities, however, was not attained until the first Pueblo period, which saw the culmination of many features prophesied in the Basket Maker III wares, in addition to the appearance of a variety of new ones.

There was no lack of material in the San Juan area from which the potters could fashion their vessels, for suitable clay is to be found in fairly close proximity to practically every ruin. The clay in itself was not sufficient, however, as some sort of binder or tempering material was necessary to prevent its cracking in the process of drying in the sun and later firing. In the unfired prototypes of the closing days of the Basket Maker II era cedar bark furnished the binder in the clay.[62] When the firing of vessels was developed it was necessary to replace the bark by a noncombustible substance and the custom of mixing sand with the clay, true sand-tempered pottery, appeared. The earliest specimens in this group show a large content of sand, the potters not yet having learned that a smaller amount of tempering and a better kneading of the clay would give it a harder, more compact texture. The later forms show a marked reduction in the amount of sand used. This in turn was replaced by ground or powdered rock which varied in nature from district to district, but in general being either dark igneous particles or a light-colored quartz-like substance. Still later periods saw the use of ground potsherds, a practice in vogue even at the present time among some of the modern Pueblo potters. Regardless of the material it was necessary to take great care not to use too much tempering, because under such conditions the cohesiveness of the clay would be lost and the vessel would tend to crack or collapse.

It is impossible to know the exact manner in which the materials were treated and how they were fashioned into bowls and jars, but a careful study of the vessels themselves and of fragments shows many things. An idea of the stages involved in the making of such an object may be gained through a knowledge of the methods employed by modern potters of the region. There is no doubt but that the vessels were made by hand and without the aid of a potter's wheel. Supports were used, as is shown by the impressions of baskets on the bottoms of some of the specimens. In some of the ruins of later periods bases formed from the cut-down tops of large jars have been found. Even at the present time some of the Pueblo women make use of similar objects.[63] It has been suggested that the latter objects might eventually have led to the discovery of the potter's wheel, since they were turned from time to time as work progressed in order that the surface occupying the maker's attention might be brought closer to her, but such is rather doubtful because even the advent of the white man and his suggested improvements has failed to make any material change in the basic Pueblo methods.

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[62] Morris, E. H., 1927, p. 198.

The earliest vessels, those of the mud-pottery group, appear to have been made by a combination method. The bottoms were molded in baskets and the sides built up by means of strips of clay rolled out to the desired size and then looped around the circumference, each loop making but a single circuit of the perimeter and being pressed or welded to the one immediately below. In the vessels with constricted openings longer loops were used where a swelling out was desired, shorter ones where a drawing in of the sides was deemed advisable. This method seems to have lasted on down through the fired wares of the late Basket Maker and early Pueblo periods, when a new method was evolved. The latter consisted of the use of longer loops of clay which were carried around the growing vessel several times before being fastened at the end. This was the beginning of the coil. Its culmination was reached in the full Pueblo periods, II and III, continuing through to the present, when the entire vessel was made from a long spiral of clay, each shorter strip being welded at its end to the one preceding, thus forming one long continuous strand. The additions were made as needed during the growth of the jar or bowl. This difference in the technique of manufacture is an important one because it marks the boundary line between characteristic Pueblo I and later vessels. The short-looped ones are of the early period while those with the spiral coils belong to the following horizons.

A great deal of attention was paid to the surfaces of the wares. In the early types all signs of the coils or loops of clay used in the building up of the walls were, as far as possible, obliterated. This was accomplished through the use of some implement, a corncob, a piece of gourd, a stick, bone, fragment from a broken pot, or a stone. In later periods, when the appreciation of decoration had reached a higher development, the coils came to play an important part in the type of vessel which was used for culinary purposes. A painted design would soon become obscure from soot and smoke from the fire, and perhaps for this reason it became the custom to allow the coils to remain on the exterior and by various ways of pinching them together and of indenting with the finger nail or some sharp-pointed instrument a pleasing decoration was obtained. The surfaces of pots destined for food bowls, storage and water jars, and other nonculinary purposes were generally smoothed down.

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[63] Stevenson, J., 1883, p. 329; Guthe, C. E., 1925, p. 27.

As indicated in the foregoing, one classification for pottery in the Southwest, irrespective of period, is based primarily on function, a feature of considerable importance not only with respect to the form and general character of the vessel but in its quality as well. Thus far no more satisfactory grouping has been developed than that of the twofold, culinary and nonculinary, grouping. The culinary vessels, as mentioned above, fall into three general classes according to the period. The earliest, those of Basket Maker III, were smooth surfaced; the Pueblo I variety were those with the banded necks; then came the indented corrugated pots of Periods II and III, whose entire exterior surfaces showed the coils from which they were made.[64] In general it may be said that the outside of these vessels is almost always black, due to their use over fires, but now and then one is found which had not been so used or, as in the case of some of the specimens from the Piedra, the soot had been burned off by fires which destroyed the houses, so that the original color of a varying shade of gray is observable.

Characteristic features of the nonculinary group in the San Juan area, irrespective of the period to which it belongs, may be generalized to the extent of stating that the surfaces of the vessels were generally smooth and usually ornamented with some form of painted decoration. This group is composed of one major and two minor forms. The major class is that of the well-known black-on-white pottery, while the two minor forms are the red with black decorations and vessels with a polished black interior, the extent of the polish depending largely upon the period in which the latter were made. The earliest forms show scarcely any polish while those of Pueblo III times have a very high gloss.

Efforts to make too limited a definition for the black-on-white pottery, light-colored vessels with painted black designs, have led to confusion and it has been found that hard-and-fast rules as to the interpretation of the term are not advisable. The light-colored surface may vary from a dull, dark gray to an almost chalky white.

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[64] For a synoptic illustration of the ancient corrugated wares see introduction to Guthe, 1925, pl. 2, by A. V. Kidder. The term Pre-Pueblo is the older name for the present Pueblo I, Early Pueblo is Pueblo II, and the Classic Pueblo examples are of the Pueblo III period in the classification used in this paper.

This depended to some extent on the question of material, proper mixing, proper firing, and other variable elements, so that the breaking up of the group into black-on-gray and black-on-white forms is not practicable. The same potter might frequently have both types in a single batch of pots. The decorations show similar traits in that the pigment may be any hue in the range from brownish-red to lampblack. This was in great part due to the manner in which the vessel was fired and is not to be attributed to a difference in the make-up of the paint. A properly fired vessel would have a good black decoration, a slight amount of overfiring would give a brownish-black and a marked overfiring the brownish-red tone. In this connection it may be noted that the tendency to brownish-red and brownish-black hues was more marked in earlier periods than after the technique of firing had become better developed and more thoroughly understood.

The red vessels with black decoration show distinct and separate characteristics for most of the periods, but inasmuch as they played a small part in the ceramics of the earlier periods, rarely does the proportion of black on red to black on white exceed 2 per cent; any extensive consideration of the various stages is not essential to the requirements of this paper. It will be sufficient to point out the main characteristics of the red wares of the Basket Maker III and Pueblo I periods. The earliest red vessels were the result of an intentional overfiring of bowls, jars, and other forms which otherwise would have been of the black-on-white variety. This overfiring imparted a light orange-red tone to the surface, although, due to a certain lack of control in the firing, shades may be found varying from a yellowish-brown to an almost good red.[65] This form of red ware first appeared quite late in the Basket Maker III horizon and extended over into the Pueblo I period. After the latter stage had gotten under way a certain amount of coloring matter seems to have been mixed with the clay. Whether this was an intentional or natural mixing is not known, but the probabilities are that the raw material contained the necessary pigment. Modern potters along the Rio Grande depend on clays containing the red pigment and not on the ordinary type which has been treated with red coloring matter. A still later development was that of the application of a liquidlike wash of clay made from the coloring matter to the surfaces of the vessel which it was desired to make red. This feature was apparently a late discovery of the Pueblo I horizon and was one which became characteristic of the red wares of later periods. The use of the "liquid" clay, called the slip, on vessels of the black-on-white group developed at about the same time, although it probably preceded that of the red wares, because pottery with a true slip is first found in the Pueblo I period.

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[65] Morris, E. H., 1927, pp. 186–187.

The vessels of the shiny black interior subgroup are of two forms. One consists of the bowls with gray to grayish-brown exterior and the other those with a brownish-red exterior. The latter seems to have been an outgrowth of the former and both are undoubtedly the prototype of the polished black interior vessels with red exteriors, which are present in fairly large numbers in later periods. What methods the early potters used to obtain the black finish can never be known with certainty, but it is very likely that they employed methods quite comparable to those of the modern Pueblo Indians in certain villages along the Rio Grande, where shiny black vessels are a favorite form of pottery. The latter use a smothered fire to obtain the desired effect.[66] The smothered fire produces a dense smoke, which penetrates the paste of the vessel and leaves a carbon deposit which gives the desired black. This black would disappear if the pots were reburned in an open flame. The prehistoric potters were not as adept in the smoking process as their modern descendants, because large, irregular black splotches on the exterior of such vessels were of frequent occurrence. The carbon deposits on the interior of bowls of this class penetrate but a short distance into the paste so that cross sections of fragments show but a thin black line.

The manufacture of pottery by the sedentary southwestern peoples was a general household industry, not a specialized craft restricted to skilled workers. As a consequence occasional forms are found which can not be fitted into any general classification. These individual variations and off forms should be considered as such, not as examples of defects in the method of systematization. A good illustration of the latter is apparent in the pottery from the Piedra. There are two groups, or rather subgroups, in the nonculinary wares which in one sense should be classified as separate forms but which in another should be considered simply as variants of one of the major divisions. There are a large number of vessels which have every characteristic of the black-on-white wares except that they have no decorations, no painted ornamentation. Some investigators and students might feel that they should be placed in a separate group, but the drawing of such fine distinctions on the part of earlier workers has led to so much confusion that it is thought that for the sake of simplicity they should be regarded merely as aberrant forms of the black-on-white group, which indeed they are. Many times the lack of a decoration can not be attributed to an original omission on the part of the maker but to the weathering away of the decoration since the vessel was made. Careful study of many specimens which suggest the entire absence of painted ornamentation shows that originally they had been decorated, but time has practically obliterated all traces of the designs.

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[66] Guthe, C. E., 1925, pp. 74–75.

The second debatable class is that of the miniature vessels which might well be grouped under the heading of toys. They could have been of no practical use and must have been the playthings of the children. Even to-day a small girl occasionally may be seen at one of the pueblos making little vessels for her own amusement. There has been some tendency on the part of a few investigators to assign these objects to the group of ceremonial offerings, but such a category seems a little far-fetched. In all respects, except that of size and usefulness, the miniature pots correspond to the general characteristics of one of the major groups, culinary or nonculinary, of vessels.

The general consideration of features of the prehistoric pottery of the San Juan area briefly sketched in preceding paragraphs has been deemed essential to a proper understanding of the ceramics of the Piedra sites because many characteristics evidenced by the latter can not be appreciated without such a discussion. As a matter of fact the pottery from the latter district presents such a variety of features that a proper examination of it can not be made without reference to the general aspects of the early development of the industry.

The major part of the pottery which is described and discussed in the following pages belongs in the A and B house grouping. Only a brief consideration will be given to the ceramics of the C group. Since only fragmentary specimens were obtained from those sites, a lengthy study is out of the question. Also, the C houses bordered so closely on the Pueblo II period that an extensive dissertation on the lesser objects of material culture accompanying them is not practicable in view of the fact that the bulk of this report deals with material from the Pueblo I horizon.

Considering the pottery from the A and B villages and houses as a unit, regardless of function, ornamentation, or shapes, there are certain features which may be considered as characteristic. The paste, the mixture of clay and tempering material which formed the substance from which the vessel was made and which in the finished object composes the body of the walls and bottom as contrasted with their surfaces, shows considerable variation. The latter is most marked in the tempering material, which may consist of white sand, small, irregular patches of igneous rock or of a light-colored stone. In general the clay used was a fine-grained type which was capable of being kneaded and mixed to a uniform consistency which would produce a hard, compact structure in the paste. The full possibilities of the raw material were seldom realized, however, because a majority of the vessels exhibit a rather granular, checked condition in their internal structure. Under proper firing conditions the paste becomes a light shade of gray or even a fairly clear white, although examples are found which are a dull, slate-gray hue. When the vessels were underfired a distinct dark streak remained in the center of the paste. The hardness of the paste, also dependent upon the mixing and firing, varies greatly. Some of the pots are hard while others are quite friable.

Surfaces on most of the vessels were smooth. That is, the loops of clay from which they were fashioned were obliterated by rubbing when the pot was still moist. The necks of the culinary jars and some of the large water and storage vessels constitute the chief exception. On the latter the bands were allowed to remain on the necks and form a simple decorative effect. The actual surface finish varies greatly but has a distinct correlation with paste quality. Containers made from well-reduced, finely-tempered clay have a comparatively smooth exterior texture, but those of the sand-paste group have rather coarse, rough surfaces. Although rubbed to a greater or less degree, none of the vessels show the careful smoothing and polishing which marks the wares of the late Pueblo II and Pueblo III periods, in fact, no polishing stones of the forms so frequently found in ruins of those periods have thus far been found in late Basket Maker or Pueblo I sites. The vessel surfaces of these early stages indicate that the smoothing implement was either a corncob, piece of gourd, stick, bone, or, possibly, a rather rough stone.

As mentioned in a preceding paragraph, the practice of covering the surface of a rubbed-down vessel with a coating of "liquid" clay to which some coloring substance, generally kaolin in the white wares and ocher in the red, had been added first appeared in this period. A number of vessels from the Piedra sites have a true slip while many have no slip at all and present the characteristic aspect of the black-on-white wares of the late Basket Makers. Many of the latter suggest the application of the clay wash but in reality have only a pseudo slip, a creamy film of clay brought to the surface in the process of smoothing and rubbing the vessel. The clay brought to the surface in this manner did not completely cover the coarse grains of tempering material and the protruding particles give to it a slightly bespeckled appearance which is typical of that period. Where a slip is present on the Piedra vessels it suggests an element of ceramic manufacture still in the developmental stages. Its characteristics are difficult to describe because it is so variable. On the same vessel it is both thick and thin. This may be considered a good indication that the clay and water were not thoroughly mixed. Possibly too much solid substance was used, and as a consequence all that in excess of the amount which would go into solution settled to the bottom of the container. In dipping up the "liquid" clay to apply it to the surface of the vessel the potter may occasionally have gone deep enough to get some of the sediment. This would account for the spottiness of the slip which in places is so thick as to be almost lumpy and in others so thin that the gray of the underlying paste shows through. On rare pieces the tendency to a thick slip is consistent over the entire vessel, and where such is the case the surfaces have a smooth, soft texture which is almost enamel-like in its quality. Many of the vessels clearly indicate that the slip was applied with a textile mop; the impression of a rubbing rag is unmistakable. The modern Pueblo potters use folded cloths to apply the slip to their vessels, and it is quite possible that this is a survival in technique from the earliest days of the industry.[67] The slip is rarely a dead white but has a faint suggestion of a pearly gray tone, a slight yellowish cast, or occasionally an almost imperceptible pinkish hue which imparts a feeling of color warmth entirely lacking in the chalky tinted vessels.

A majority of the ceramic objects in the Piedra collection bearing a slip are of the bowl form, but this is in part attributable to the greater number of bowls, the percentage in the various groups being quite consistent. A rather interesting contrast between the bowls and other forms, however, is that the latter when decorated generally have a slip while the former has a large number without the extra surface treatment. There is a point of some significance in this factor when it is recalled that in the preceding period, when no slips were present, ceramic decoration was confined largely to bowls. The appearance of the slip and the development of jar and pitcher ornamentation are features of the Pueblo I period, and under such circumstances it seems fitting that they so frequently occur together. The collection of pottery shows 46.3 per cent of the vessels with a slip, excepting of course the culinary pots which rarely were so treated. The difference between this group and specimens of the nonculinary vessels from sites of later periods is quite marked. The percentage of nonslipped vessels in the latter is so small that it is practically negligible. Here, then, is an interesting contrast. The late Basket Maker pottery is characterized by a total absence of the slip, in the Pueblo I wares slightly less than half have it, while in the later periods of the Pueblo cycle it is present in practically all cases.

There was still another feature in the treatment of the exterior surfaces of vessels. This was the application of a red wash. The latter was not fired into the surface and made permanent; hence it is very indistinct or not apparent at all on many of the fragments and specimens found. Where potsherds or vessels were exposed to the weather all traces of it have been washed away, but whenever they are found in protected places the red is quite noticeable. The feature was missed entirely by many of the earlier investigators in the region because they neglected to study their finds before they were washed and cleaned. The impermanent nature of the red wash led to the adoption of the term "fugitive red" by southwestern archeologists. Whenever that term is used reference is made to surface treatment of the kind just described. It is a common characteristic of the late Basket Maker pottery[68] and is to be observed on many of the Piedra specimens. The practice does not seem to have survived to any great extent in the following Pueblo periods. In fact, its discontinuance may be associated in some way with the application of a true slip to the various pottery forms. Just what the relationship between the two features is has not been ascertained, but the one did not last for any great length of time after the appearance of the other.

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[67] Guthe, C. E., 1925, p. 57.

VESSEL FORMS

At no other period in the prehistoric Southwest was there such a diversity of form in ceramic objects. The variety of shapes is so numerous, the lack of rigid conventions so marked, that it makes classification of form even more difficult than in the ceramics of the later periods where archeologists have not found it easy to obtain suitable names for the vessels. In general, however, it may be said that the vessel shapes as illustrated by the collection include full-bodied jars with long tapering necks and constricted orifices; full-bodied jars with short, cylindrical necks and constricted orifices; globular-bodied jars with short, squat necks and wide orifices; full-bodied vessels of an elongated spherical or ovoid shape with short necks and wide orifices; globular or spherical pots with a small, circular opening at the top; globular pots with a depressed or flattened top and small circular orifice, the so-called seed jar forms; bowls; pitchers of many varieties; ladles of various forms; bird-shaped vessels; cylindrical jars; double-lobed jars; egg-shaped vessels; and eccentric forms. Although the 1928 work along the Piedra did not yield a specimen of the effigy type, animal forms must be included in the general list. The writer found, in his previous work in this district, an unusually fine duck and a mountain sheep.[69] Both unquestionably belong to the same class and period as the pottery found in the recent investigations. There are some forms which are found in sites of this period in other sections of the San Juan which are not represented in the collections from the Piedra district. Whether they existed in the latter or not can not be stated. They possibly were absent and again it may be that examples simply have not been found.

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[68] Morris, E. H., 1927, pp. 176–177; Roberts, F. H. H., jr., 1929, pp. 110–111.

[69] Roberts, 1925, pl. 20.

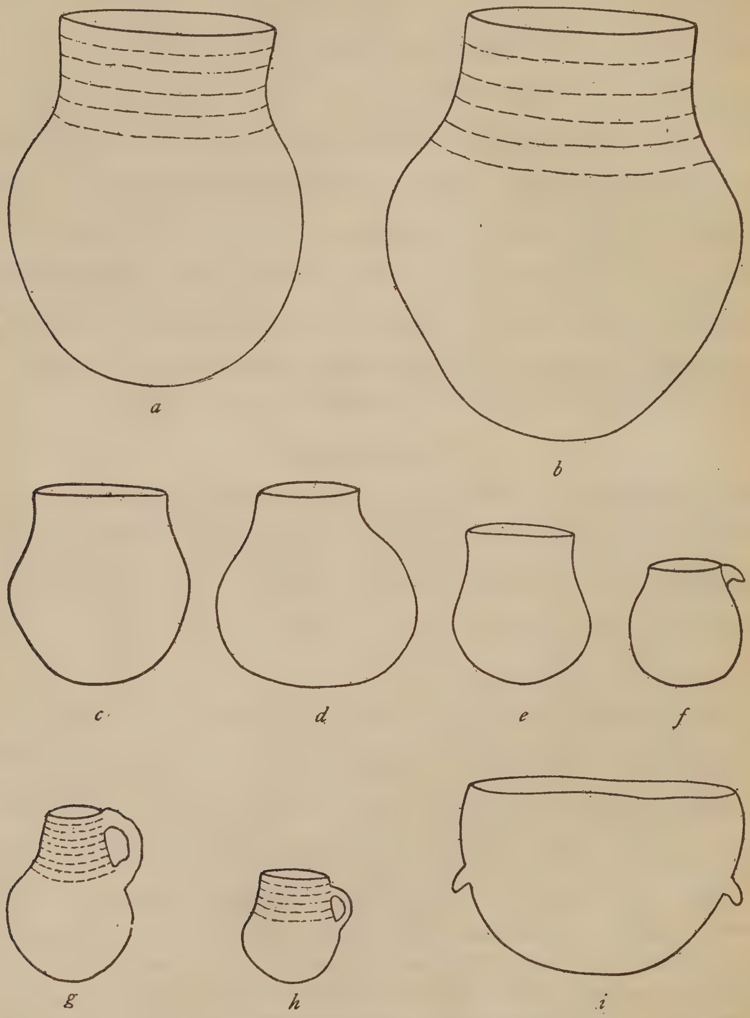
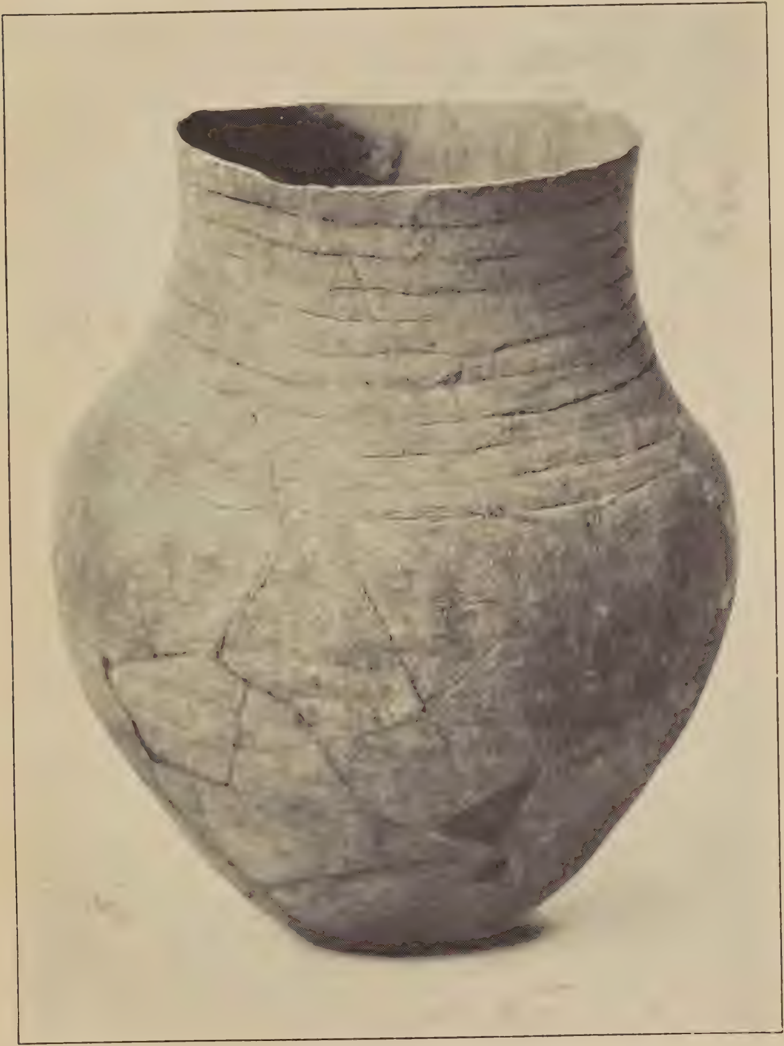
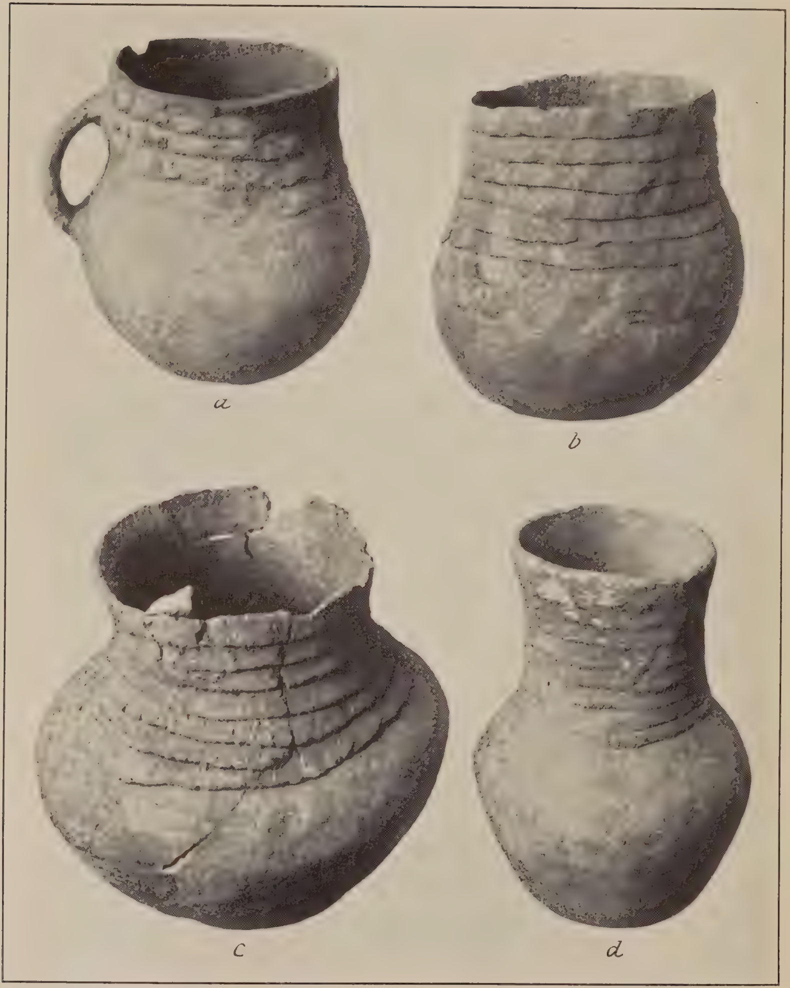


FIGURE 15.—Culinary vessel shapes

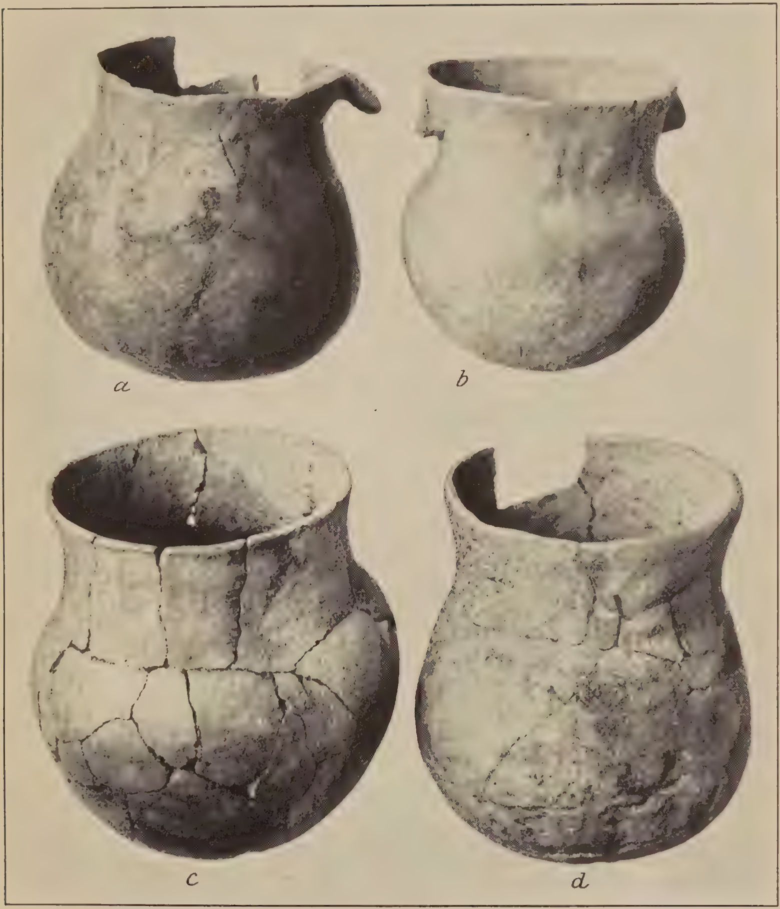
There was not as great a variety in the shapes of the culinary vessels as in the nonculinary group. That there were some differences, however, is apparent in the outline drawings of the common types. (Fig. 15.) The shapes occurring most frequently seem to have been those with roughly globular or ovoid bodies (fig. 15, *a*, *b*;



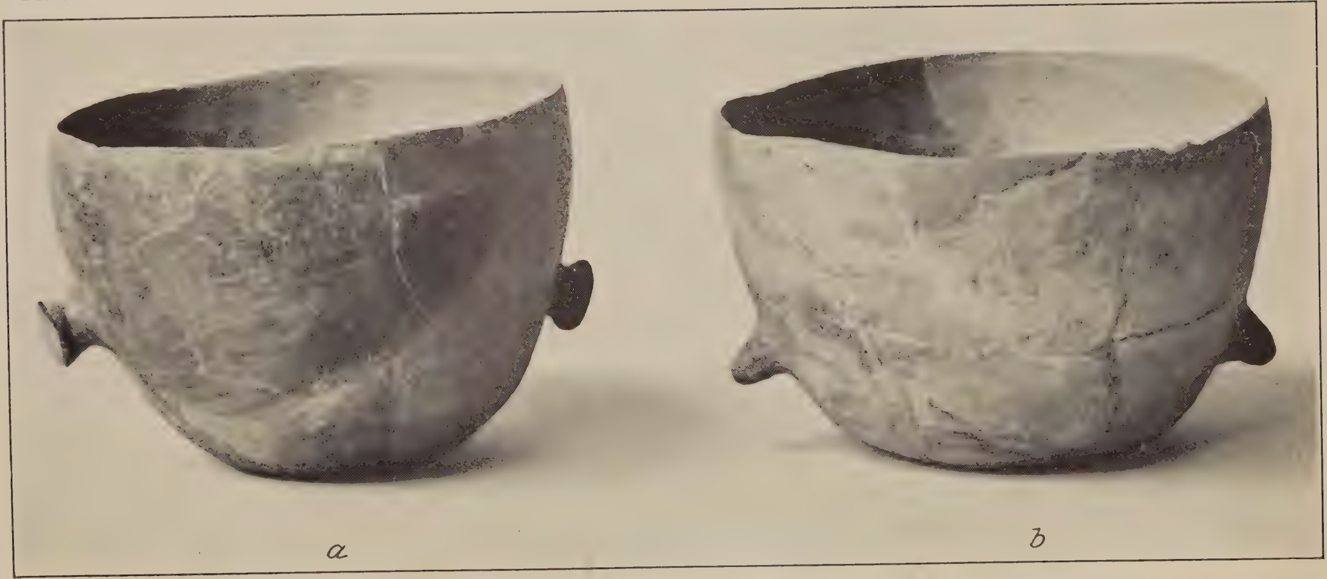
BANDED-NECK CULINARY JAR



SMALL CULINARY VESSELS WITH BANDED NECKS



SMALL CULINARY VESSELS WITH SMOOTH EXTERIORS



LARGE BOWLS USED IN COOKING

pls. 13, 14, 15), with necks whose sides were vertical, sloped slightly inward, or had a tendency to curve outward. A great majority of the necks on these vessels show traces of the bands of clay from which the pot was built up. The latter were entirely obliterated on the body but only lightly rubbed on the neck portions; in rare cases (pl. 14, *b*, *c*, for example) they were not rubbed at all. The presence of slightly blurred neckbands is of such frequent occurrence that they may be considered as one of the characteristic features of the jars of this class. Practically identical specimens belonging to the culinary group were found in the La Plata district by Mr. Morris.[70]

There were many of the completely smoothed forms, but they constituted a smaller and much more variable group. (Fig. 15, *c*, *d*, *e*, *f;* pl. 15.) The latter are quite reminiscent of some of the smooth-surfaced culinary vessels of the late Basket Makers.[71] This is true not only of the form and surface treatment but in their appearance as well. Quite a large proportion of them have the rough, bespeckled quality described for the earlier vessels and no doubt represent a survival of such forms. As a matter of fact, even the banded neck groups suggest considerable relationship in form to some of the plain-surfaced jars of the preceding horizon.

One of the curious forms in the culinary group and one which apparently did not survive in later periods is that of the tublike bowls. (Fig. 15, *i;* pl. 16.) The manufacture of bowls for cooking purposes was not common in the Pueblo cultures and up to the present time has been reported from only one late Basket Maker site.[72] These vessels differ from the ordinary type of bowl in that they have a slightly incurved wall just below the rim and in the proportion of the depth to the diameter. They correspond more closely to the body sections of the culinary jars or even to those of some of the seed jars of the nonculinary group. There is a possibility that they may represent a developed phase of one type of culinary vessel found in the Basket Maker III horizon which is practically absent in the Pueblo I. This is the form which Mr. Morris has called the depressed spherical vessels without necks.[73] All that would be needed to convert such forms into the tublike vessels would be to enlarge the orifice and add handles. The suggested but debatable prototype of the latter has not been included in the outline drawings because only two such vessels are represented, both by fragments, in the collection from the Piedra. They constitute so small a percentage of the culinary vessels that they can not be considered an average form. They could very well be a survival of actual objects from the preceding period.

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[70] Morris, E. H., 1919 b, pl. 63, *b;* pl. 68, *a, b, c, d, e, f;* pl. 70, *d*.

[71] Morris, E. H., 1927, p. 165.

[72] Roberts, F. H. H., jr., 1929, p. 112.

[73] Morris, E. H., 1927, pp. 163–164; Roberts, F. H. H., jr., 1929, fig. 29, p. 112; Kidder, A. V., and Guernsey, S. J., 1919, pl. 59, *a*.

The tublike vessels present still further complications in that they are capable of being classed in either the culinary or nonculinary categories. They are an example of one of the difficulties encountered in any attempt to establish hard and fast rules for ceramic classification. They illustrate one of the objections frequently made to the functional consideration of pottery. Enough of three vessels was secured to make possible their restoration, although fragments from many more were found, and of the three, two had definitely been used for culinary purposes. They were found in the fire pits of the houses from which they came, showed blackening by smoke, and one contained charred residue from some food substance which had boiled dry in it. The third shows no signs of having been placed over a fire and in addition has a slip and a decoration on the interior. The paste of all three is of the coarse, rather sandy type characteristic of the culinary vessels. This would suggest that the decorated one was the aberrant form rather than that the other two had been put to a use for which they were not primarily intended. It may be remarked further, that of all the fragments from such vessels which were noted during the progress of the work no other indication of a painted decoration was observed.

Pitcher forms in the culinary group seem in general to have been of two varieties. One had a rather high neck and constricted orifice (fig. 15, *g*) rising from a spherical body. On the pitchers of this form the handle extended from the rim to the shoulder. The second form (fig. 15, *h;* pl. 14, *a*) was characteristically of the general cooking-pot shape; the body form is exactly that of the large banded-neck vessels. The only distinction to be made is that one type has a handle while the other does not. The handle did not extend from the rim, however, but was joined to the wall of the neck a short distance below it. The orifice at the top was much larger in this form of culinary pitcher and the vessel probably more serviceable for that reason. That this was recognized is indicated by the fact that it was the more prevalent form. The latter is found in practically every early Pueblo site. It is not confined to the Pueblo I period but survivals are found extending down into later periods. The survivals in some cases are probably representative of the form only, having been made in the later stages, and in others no doubt are vessels which actually passed down to subsequent horizons. Morris obtained examples in his La Plata work, Fewkes found them in the Navaho National Monument district, Kidder and Guernsey likewise secured the form there and they have been reported from other districts.[74] Many of the latter, however, are from ruins subsequent to the Pueblo I period.

There was a marked gradation in the size of the vessels, even when the miniature forms are excepted. The jars of the globular-bodied form (fig. 15, *a*) range from a height of 3⅞ inches (9.9 cm.) to 13½ inches (34.3 cm.). Body diameters in the group grade from those of 3$\frac{11}{16}$ inches (9.4 cm.) to those measuring 11⅛ inches (28.3 cm.). Neck heights—that is, the banded portions of the jars—vary from 1¼ inches (3.2 cm.) to 3$\frac{11}{32}$ inches (8.5 cm.). There was not as great a difference in the thickness of the walls of the various vessels as in their other measurements. The range in average wall thickness was only from five thirty-seconds of an inch (4 mm.) to one-fourth inch (6.4 mm.). The bottoms have a greater average thickness than do the walls of the jars. They range from one-fourth of an inch (6.4 mm.) to five-eighths of an inch (1.6 cm.). An occasional specimen will show a bottom thickness of three-fourths of an inch (1.9 cm.).

The cooking jars with the ovoid-shaped bodies and banded necks (fig. 15, *b*) show a range of height from 5½ inches (14 cm.) to 15¼ inches (38.7 cm.). Their body diameters are from 3¾ inches (9.54 cm.) to 12$\frac{7}{16}$ inches (31.6 cm.). Neck heights, from the lip of the rim to the bottom of the lowest band, grade from 2$\frac{7}{16}$ inches (6.3 cm.) to 5$\frac{11}{16}$ inches (14.5 cm.). There is no appreciable difference in the average thickness of the vessel walls in this group. All approach so closely to three-sixteenths of an inch (5 mm.) that it may be considered as the normal measurement for that feature. Bottoms show a slight variation with a range of from one-fourth of an inch (6.4 mm.) to three-eighths of an inch (9.6 mm.). Some of the larger vessels possibly have an even greater bottom thickness but it was not possible to measure them. Such specimens would constitute a very small percentage of the group, however.

The pitchers of the typical cooking-pot form with handle attached (fig. 15, *h*) were rather small. Their height variation ranges from 4½ inches (11.45 cm.) to 8 inches (20.32 cm.). The body diameters grade from 4$\frac{1}{16}$ inches (10.3 cm.) to 6½ inches (16.51 cm.). Neck heights are 1$\frac{9}{16}$ inches (4 cm.) to 3½ inches (8.89 cm.). The average thickness of their bottoms and walls show such slight differences that they are practically negligible, being from five thirty-seconds to three-sixteenths of an inch (4 to 5 mm.).

Pitchers with spherical bodies and inward sloping necks with constricted orifices (fig. 15, *g*) are as a group somewhat larger than the preceding form. Heights are from 7½ inches (19.1 cm.) to 11 inches (27.94 cm.). Body diameters grade from 5$\frac{15}{16}$ inches (15.1 cm.) to 12½ inches (31.75 cm.). The banded portions vary from 3 inches (7.62 cm.) to 5¼ inches (13.34 cm.). The average thickness is five thirty-seconds inch (4 mm.) to one-fourth inch (6.4 mm.).

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[74] Morris, E. H., 1919 b, pl. 70, *c*; Fewkes, J. W., 1911 a, pl. 18, *b*; Kidder, A. V., 1924, pl. 34, *g*.

The smallest of the tublike vessels has an average height of 9 inches (22.86 cm.). The circumference tends to the elliptical rather than the circular form with diameters of 11⅞ inches (30.18 cm.) and 12¾ inches (32.4 cm.). The average wall thickness is one-fourth inch (6.4 mm.). The intermediate form has an average height of 9$\frac{5}{16}$ inches (23.8 cm.) and an average diameter, it more closely approaching the circular form, of 14⅜ inches (36.5 cm.). Its walls average one-fourth inch (6.4 mm.) in thickness. The latter increases in the vicinity of the handles, and the bottom reaches a maximum of five-eighths of an inch (1.6 cm.). The largest of the group has a height of 9$\frac{3}{16}$ inches (23.4 cm.), an average diameter of 15 inches (38.1 cm.), and an average thickness of five-sixteenths inch (8 mm.). The bottom has a seven-sixteenths inch (1.2 cm.) thickness.

Handles on the tublike bowls are placed well down on the sides of the vessels. Those on the first are 4½ inches (11.43 cm.) below the rim. The second one has them 4⅝ inches (11.8 cm.) below the rim and the third one 6 inches (15.24 cm.) down on the side. The forms of the handles themselves are as distinct as their measurements. Those on the first or smallest vessel are of the flat, shelf-like type. They measure 1 inch (2.54 cm.) in length, 1½ inches (3.81 cm.) in width and are one-eighth of an inch (3 mm.) thick. The second one has handles of the "door-knob" type. They are 2 inches (5.1 cm.) in diameter and extend out from the sides of the vessel 1½ inches (3.81 cm.). The largest vessel has handles of the nubbin type. They are 1⅜ inches (3.5 cm.) in diameter at the base and project from the vessel walls 1¼ inches (3.18 cm.).

The small vessels with smooth surfaces which represent a survival from the preceding period range in size from those with a body diameter of 3$\frac{11}{16}$ inches (9.4 cm.) and height of 3⅞ inches (9.9 cm.) to those with a body diameter of 6 inches (15.24 cm.) and a height of 6¼ inches (15.9 cm.). The average wall thickness ranges from five thirty-seconds of an inch (4 mm.) to three-sixteenths of an inch (5 mm.).

Vessels comprising the nonculinary group show a much greater variety of forms. This may in part be attributed to the fact that their functional requisites were less restricted than were those of the cooking pots where efficiency was the prime consideration, and in some degree to a striving for containers which would be both useful and pleasing to the eye. The nonculinary vessels were the forms which furnished the background upon which designs were painted, and the desire for artistic expression exemplified by the decoration seems to have been reflected in the vessels themselves. A badly formed jar, pitcher, or bowl would scarcely be compatible with a well-conceived design, and although the potters of the period fell far short of perfection in both shape and ornamentation there is evidence of a conscious striving toward that end.

Although the black-on-white, black-on-red, black interior, and unpainted vessels might well be considered as separate groups, there is so pronounced an overlapping of shapes that the discussion will be greatly simplified by considering the nonculinary vessels as a unit. The black-on-red and black interior wares constitute so small a percentage that attention may be called to the forms peculiar to them without devoting a separate section to their description. The unpainted vessels, as already mentioned, have such close relationship to the black-on-white group that they should be classified with them. As will become apparent in the ensuing discussion, there is a certain constancy of shape in some classes, the bowls for example, while others, especially the jars and pitchers, exhibit considerable diversity.

The large water or storage jars have marked individual variations which make them rather difficult to classify in a study of shapes, but there are certain forms which may be considered as typical and representative of the period. Those illustrated in the outline drawings (fig. 16) may be considered as characteristic of the four, however, *a* and *d* being the most typical.

The body shape, from the line of greatest diameter to the bottom, is generally between a half-oval and a hemispherical form. The bottoms are either rounded or slightly flattened and none have the small concavity which is apparent on so many of the large jars of later periods in the San Juan area. Quite a number show clearly the imprints of the baskets in which they rested while being made. The upper parts of the vessels show the greatest variation. They were generally slightly depressed or flattened and then turned upward to form the neck. The main difference in many of the vessels lies in the extent of the flattening of the upper zone. The forming of the neck by continuing the vessel walls upward is a feature similar to that found in the jars of the Basket Maker III wares where the neck was also a part of the vessel wall. One group, however, had a characteristic which is found to prevail in the later horizons. The neck was made as a separate piece and then joined to the body. This form is represented in Figure 16, *c*, and Plate 18, *b*. The latter suggests quite strongly the globular-bodied, short-necked jars of the following periods; perhaps represents their prototype. The egg-shaped body illustrated in Figure 16, *b*, and Plate 18, *a*, is not as characteristic of the Piedra wares as the other forms (pls. 17; 19, *b*), but still may be considered as a type in that more than one example is represented in the collection. It suggests a variation of the *c* form but fits into the general group. Its chief difference is that the upper portion is more rounded than in the other shapes.

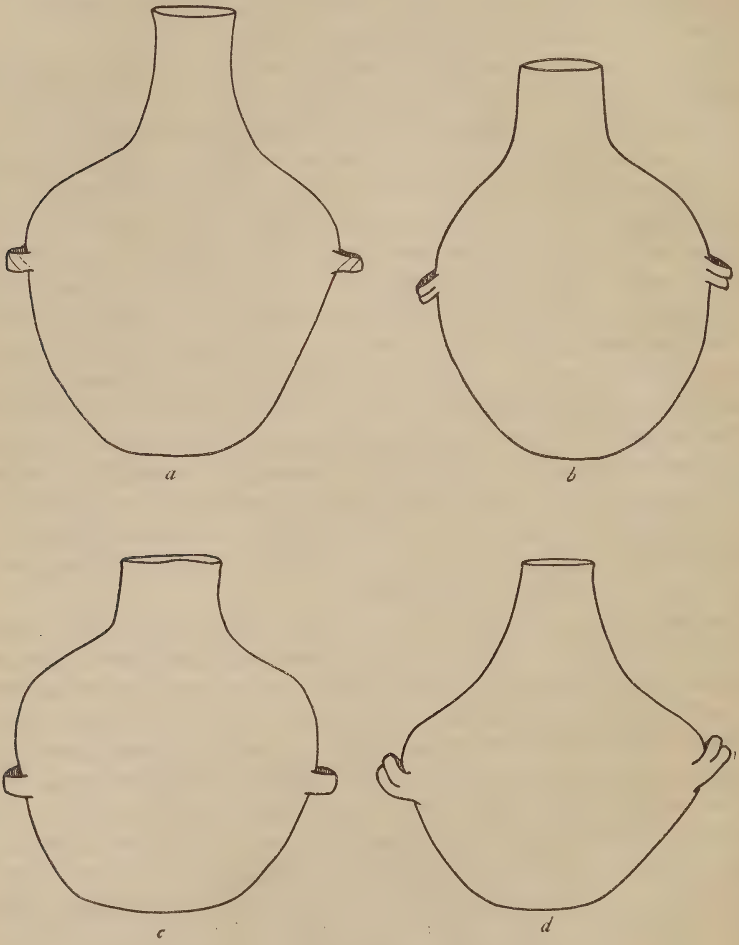
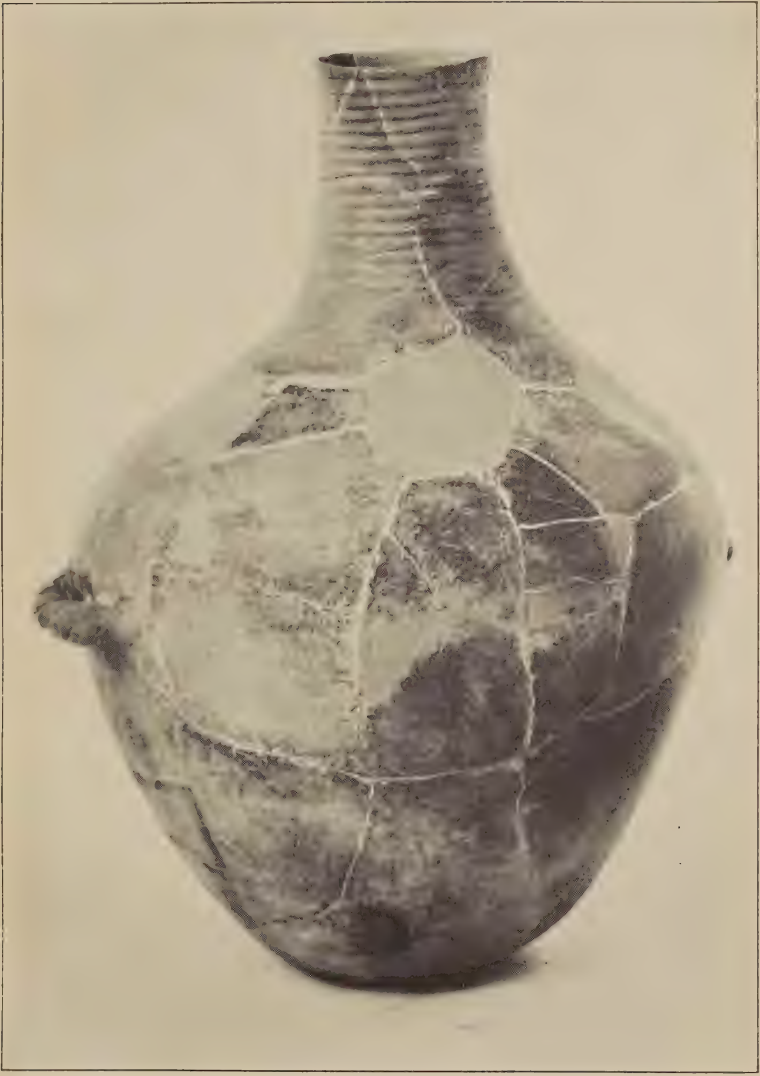
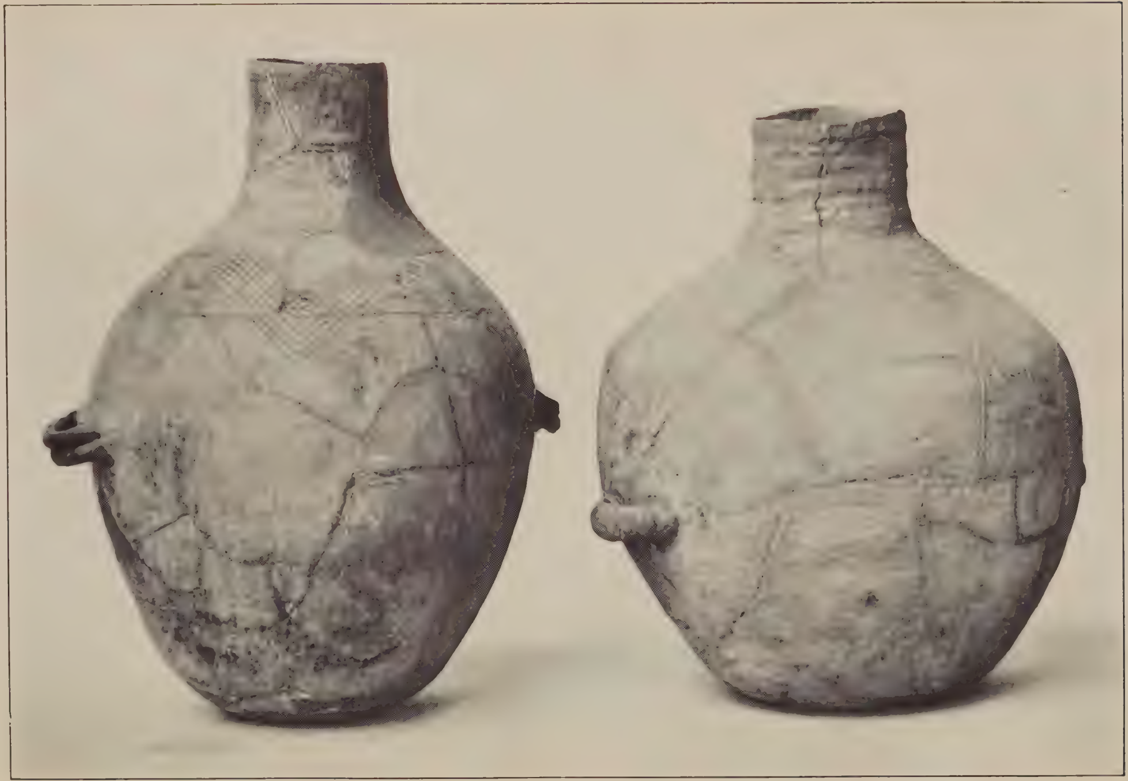


FIGURE 16.—Storage and water jar shapes

The necks on the various vessels are either smooth and decorated or the bands of clay from which they were built up have been left unrubbed as in the case of the culinary jars. Examples of both treatments have been found in all of the shapes. The remainder of the surfaces on the jars were smoothed down. The paste and surface quality, however, is as variable as the shapes. Some of the vessels

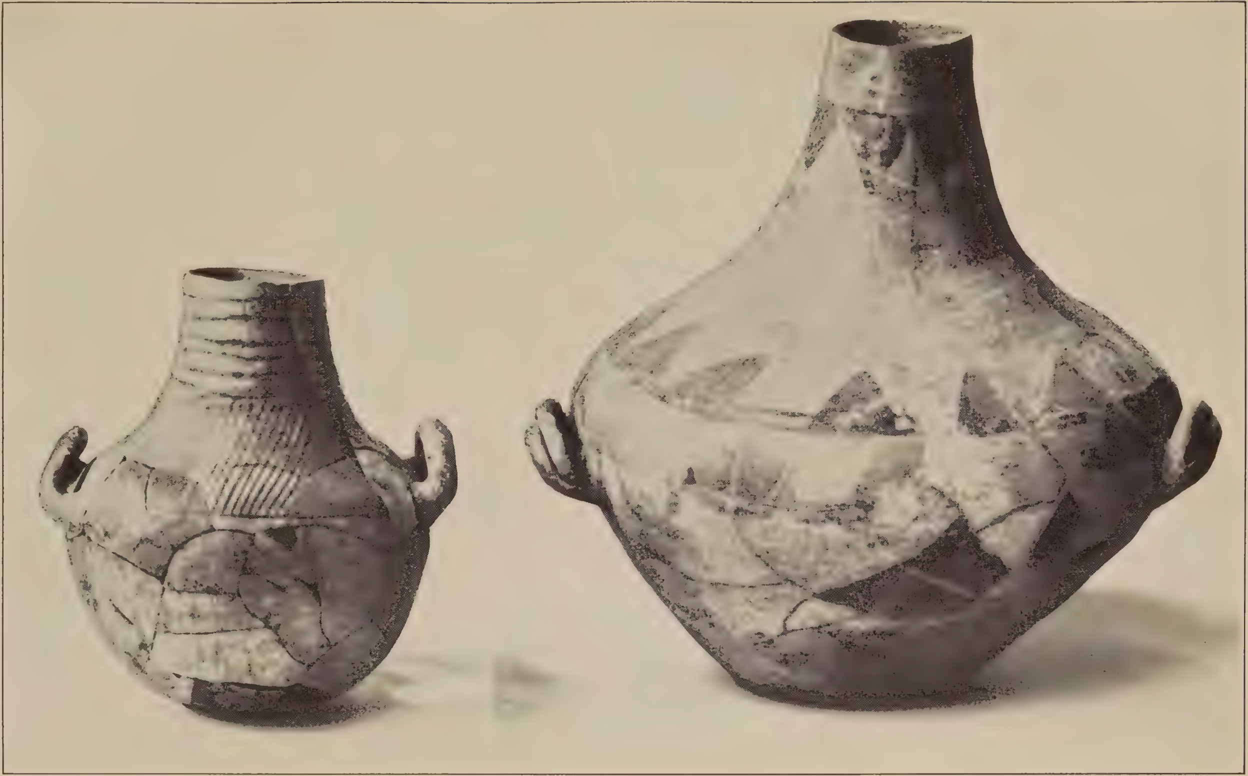


BANDED-NECK STORAGE OR WATER JAR



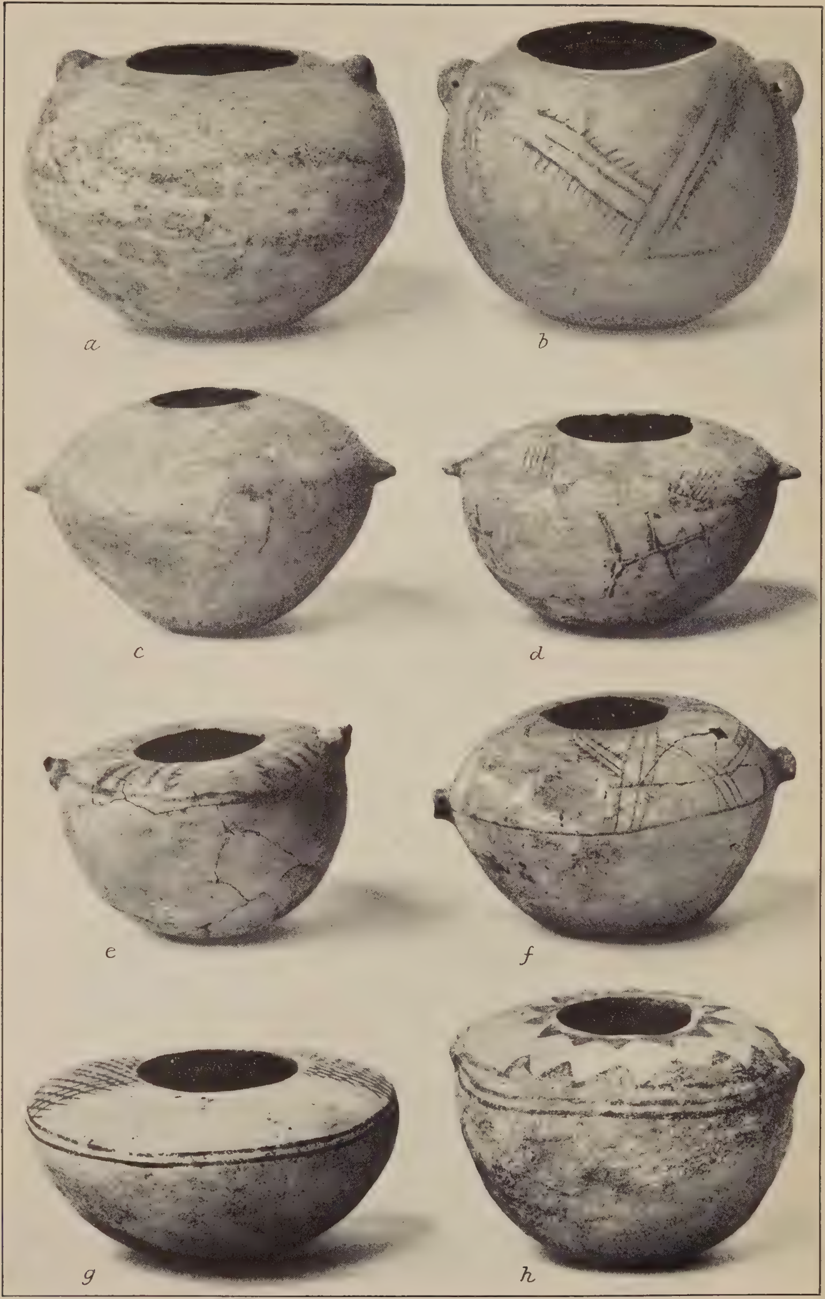
a b

NONCULINARY STORAGE OR WATER JARS



a *b*

DECORATED STORAGE OR WATER JARS



DIFFERENT FORMS OF SEED JARS

have coarse, sandy paste quite like that of the culinary wares, while others are characterized by fine, hard walls and comparatively smooth exteriors. Both slipped and unslipped examples are in evidence. Some are decorated and many are not.

The greatest variation in the vessels of this group is in the handles. There are almost as many different forms of the latter as there are jars. The individual fancy of the potter seems to have found an outlet in that portion of the pots which the tendency to conform to style in shapes denied. In some cases the handles are merely stubs or nubbins of clay protruding from the side of the jar, in others they are a single loop of clay, flat or twisted. Still others consist of double loops of clay, bent upward or downward and occasionally twisted. Sometimes the handle was bifurcated and the ends shaped in a semblance of horns. On other jars they are merely broad, flat protuberances suggestive of the stubby tail of a bird. Occasionally an effigy form is found. The latter represent either birds or animals. The modeling is of the impressionistic kind, however, and the bird or animal represented not easily identifiable.

That jars of the types described in the preceding paragraphs are characteristic of the period and the culture is shown by their marked similarity to specimens from the Pueblo I sites in the La Plata region. Mr. Morris found many examples that can not be distinguished from the Piedra vessels.[75] As a matter of fact, all four shapes are represented in his collection from that district. It is possible that comparable forms have been found in other early sites, but a careful check of the reports on various investigations has failed to show that such is the case.

Only one of the group illustrated by Figure 16, *a*, and Plate 17 has been restored from the fragments brought in from the field, so that the range in size can not be given, but from the remaining shattered vessels capable of being assembled it can be stated that they approximate closely the measurements of the example which is illustrated. The specimen figured has a height of 20½ inches (52.1 cm.) and a body diameter of 14¼ inches (36.2 cm.). The neck height is 5 inches (12.7 cm.) and the diameter of the orifice 4$\frac{1}{16}$ inches (10.3 cm.). The average thickness of the walls of the vessel is seven thirty-seconds of an inch (6 mm.). The bottom averages five-eighths of an inch in thickness (1.6 cm.). The handles, which are of the single-loop, twisted variety, measure 4$\frac{1}{16}$ inches (10.3 cm.) in length, are 2$\frac{3}{32}$ inches (2.8 cm.) in width and thickness and extend from the side of the jar three-eighths of an inch (1 cm.).

Jar *b*, Figure 16, Plate 18, *a*, has a total height of 17⅜ inches (44.2 cm.) and a body diameter of 12$\frac{1}{16}$ inches (30.7 cm.). Its neck is 3$\frac{11}{16}$ inches (9.4 cm.) in height and the diameter at the orifice is 4 inches (10.16 cm.). The average thickness of the walls is nine thirty-seconds of an inch (7 mm.). The bottom has a one-half inch (1.27 cm.) average thickness. The handles, which are of the simple double-loop variety, have an average length of 4$\frac{7}{16}$ inches (11.3 cm.), are 1 inch (2.54 cm.) wide and one-half inch (1.27 cm.) thick. They project from the wall eleven-sixteenths of an inch (1.8 cm.).

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[75] Morris, E. H., 1919 b, pl. 67.

Jar *c*, Figure 16, Plate 18, *b*, has a total height of 15¾ inches (40 cm.) and a body diameter of 13⅜ inches (34 cm.). The neck height is 3¼ inches (8.3 cm.) and the diameter at the orifice is 4¼ inches (10.8 cm.). The average wall thickness is nine thirty-seconds of an inch (7 mm.) and the bottom five-eighths of an inch (1.6 cm.). The handles, of the simple one-loop type, have an average length of 3¼ inches (8.3 cm.). The width averages 1$\frac{1}{16}$ inches (2.8 cm.) and the thickness eleven-sixteenths of an inch (1.8 cm.). Their inner surfaces are one-half inch (1.27 cm.) from the sides of the jar.

The jar figured as *d*, Figure 16, and Plate 19, *b*, is 15$\frac{9}{16}$ inches (39.5 cm.) in height and has an average body diameter of 13⅞ inches (35.3 cm.). Jars of the same group with a much larger body diameter are represented in the collection, but on most of the latter portions of the necks are missing, so that the height can not be determined. The largest body diameter noted is 15 inches (38.1 cm.). The neck height of jar *d* is 6½ inches (16.5 cm.). The neck is oval in contour and has diameters at the orifice of 3⅜ and 3⅝ inches (8.6 and 9.2 cm.). The average thickness of the walls is seven thirty-seconds of an inch (6 mm.) and of the bottom one-half inch (1.27 cm.). The average length of the handles, which in this case are of the double-loop variety with a pronounced upward curve, is the same as that for the preceding jar, 3¼ inches (8.3 cm.). The average width is 1¼ inches (3.2 cm.) and the average thickness five-eighths of an inch (1.6 cm.). The handles project nine thirty-seconds of an inch (7 mm.) from the vessel walls.

The group of vessels called seed jars, in some reports referred to as heart-shaped bowls, also shows marked variations in form. The simplest and the earliest were those with a pronounced globular body and small orifice. (Fig. 17, *a*.)

This form occurs both with and without handles. When the latter are present they generally take the form of a simple knob or cone of clay as illustrated in Figure 17, *b*; Plate 20, *a*. These lugs, usually two in number, are placed on opposite sides of the opening. They frequently have small vertical holes passing through them. Small cords passed through the holes would have enabled the owner to hang the vessel from the ceiling of the house or other convenient place where it would be out of the way. Some of the modern Indians, however, explain the presence of the holes on a different basis. They claim that the perforations were so placed in order that bits of feathers could be placed in them and the jars used as ceremonial objects on the clan altars. Such a thing is, of course, possible, but whether such actually was the case can not be known.

The globular shape was a common one in the so-called seed jars of the Basket Maker III period and it continued to be quite popular during the early stages of Pueblo I. An interesting feature in the technique of manufacture makes it possible to distinguish these vessels from the standpoint of period. Those of the Basket Maker III horizon had a characteristic treatment of the lip of the orifice which sets them apart from the following group. The Late Basket Maker potters when completing their vessels smoothed the opening by rubbing upward and outward from the interior. As a result of this practice a slightly perceptible ridge remained around the orifice. This was frequently rubbed but not completely obliterated. The comparable Pueblo I jars show that just the opposite procedure was followed. The opening was smoothed from the outside toward the interior and to find the slight ridge resulting it is necessary to feel inside the pot. This practice seems to have been an early development of the period as all of the Piedra specimens show it.

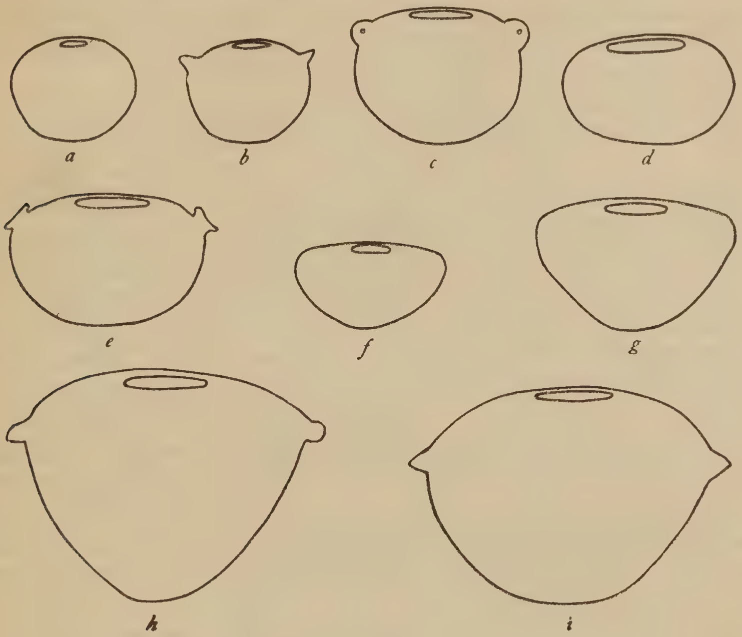

FIGURE 17.—Seed jar shapes

A slight variation of the globular form with a moderately depressed top and larger orifice is quite common. (Fig. 17, *c*.) Seed jars of this form frequently have small handles placed vertically on the sides in a manner suggestive of ears. In practically all cases these are perforated by small holes which pass through the clay on a horizontal line instead of being perpendicular as noted for the *b* forms. (Pl. 20, *b*.)

The globular body eventually gave way to one which was more oval in form. There are examples in this group, both with and without handles. (Fig. 17, *d*, *e*.) The handles show great variation. They may be of the " door knob," nubbin, effigy, or loop variety. It is of interest to note that the body shape illustrated in *d* is the one most frequently found in the black-on-red group.

From the oval shapes it was a natural step to the next forms. The latter may be considered as characteristic of the Pueblo I period. Where the globular body was typical of the Basket Maker III ceramics the flattened top and hemispherical or half-egg-shaped body predominates in the first Pueblo horizon. In the Piedra district there was a marked tendency toward the half-egg shape with flattened top (fig. 17, *f*, *g*, *h*), although the hemispherical body form, *i*, was present in fairly large numbers. These vessels in a large majority of cases have handles of one form or another. Most of them are of the broad, flat, shelf-like form which is suggestive of a stubby bird tail. (Pl. 20, *c*, *d*.) Loop forms are present in fairly large numbers, however, and there is an occasional example of an effigy, usually some indeterminate animal. One of the jars has well-modeled likenesses of human mammae for handles. (Pl. 20, *e*.) Such representations are not uncommon in the canteen shapes of later periods,[76] but this is the first example thus far observed in the wares from the earliest Pueblo stage. It definitely sets at rest the contention of many that the representations of the mammae on pottery was a development growing out of contact with the white man.

Seed-jar forms prevail throughout the following periods in the San Juan and are found to some extent in other cultural areas, but in no case do they seem to have been present in such abundance or in as great a variety of shapes as in the Piedra sites. This feature is so marked that it may be considered as one of the characteristics of the early Pueblo ceramics in the Piedra region.

Sizes vary to an even greater degree than the vessel shapes. The globular forms, with the exception of the miniature group which is not included in any of the measurements, range from an average diameter of 4 inches (10.16 cm.) to 8½ inches (21.6 cm.). The commonest size falls in the range between 5 and 7 inches (12.7 and 17.8 cm.). The diameter of the orifices varies from 2 inches (5.1 cm.) to 3½ inches (8.9 cm.).

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[76] Cushing, F. H., 1886, pp. 512–513.

The oval body group on the whole is more consistent, ranging from a height of 2¾ inches (7 cm.) to 5⅜ inches (13.7 cm.) and a diameter of 3½ inches (8.9 cm.) to 7⅞ inches (20 cm.). The orifices grade from a diameter of 3¼ inches (8.25 cm.) to 3⅞ inches (9.8 cm.).

The flattened top forms vary from a body height of $3\frac{5}{16}$ inches (8.45 cm.) to $8\frac{7}{16}$ inches (21.4 cm.); and from a body diameter of 4¾ inches (12.1 cm.) to $12\frac{1}{16}$ inches (30.7 cm.). The orifices grade from a 2¾-inch (7 cm.) diameter to one of 5 inches (12.7 cm.). The hemispherical and half-egg-shaped body forms in this group are so closely allied in the matter of measurements that the figures given are characteristic of both.

The average wall thickness for the entire seed-jar group ranges from three-sixteenths of an inch (5 mm.) to nine thirty-seconds of an inch (7 mm.). The bottoms vary from an average of one-fourth of an inch (6.4 mm.) to one-half inch (1.27 cm.) in thickness. It is of interest to note in this connection that the wall thicknesses of all of the vessels, regardless of kind, show approximately the same measurements. Practically the entire collection falls within the three-sixteenths to nine thirty-seconds of an inch (5 to 7 mm.) group. This would indicate that the potters rolled out their loops of clay to a rather definite size, irrespective of the kind or size of vessel which they were planning to make.

The pitchers of the nonculinary wares also show a variety of shapes. Typical forms are illustrated in the group of outline drawings, Figure 18, and in Plates 22 and 23. The body shapes of these vessels, from the line of greatest diameter to the bottom, are quite similar to those of the storage and water jars. Some are of the hemispherical form while others tend to the semiovoid shape. On certain vessels there is a pronounced shoulder at the line of greatest diameter (fig. 18, *b*, *d*), while others are more rounding (*a*, *c*, *e*, *f*). Body walls in most cases merge rather gradually into the necks, but in certain forms (fig. 18, *f*, *g*) there is a definite line of demarcation between the two. The bottoms are either rounded or flat, the rounded forms predominating. There were no pitchers with slightly incurved or concave bottoms.

The greatest differences in the pitchers are in the necks. Some of the latter have slightly incurved walls with just a faint suggestion of an outward flare at the rim (fig. 18, *a*); in others the sides slope gradually inward from the body to the orifice (fig. 18, *b*, *c*, *e*); still others have practically vertical walls (fig. 18, *d*, *f*, *g*, *h*). The shape illustrated in outline *h* is practically the same as that noted for one of the culinary vessel pitcher forms.

The shapes illustrated in Figure 18, *i*, *j*, are clearly representations of gourds. The neck portions are continued and bent downward to form hollow handles for the vessels. On the smaller of the two forms the neck or handle curves down until the tip almost but not quite touches the incurving side just above the shoulder of the vessel; on the larger it actually touches. Such pitchers could be made by cutting a circular opening in the top or neck of a gourd of that type.

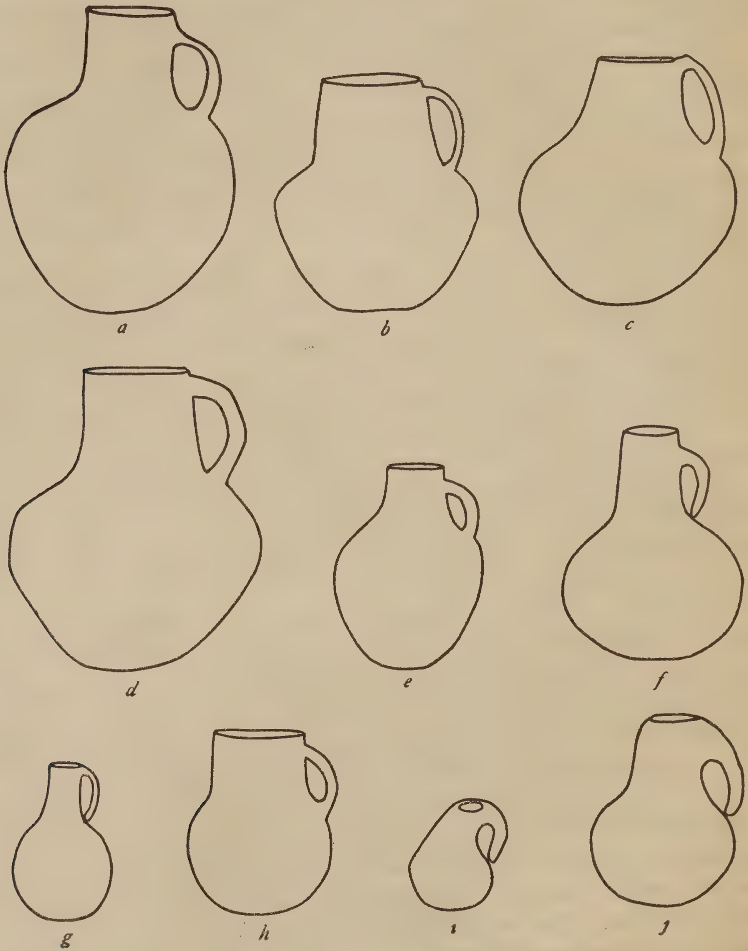
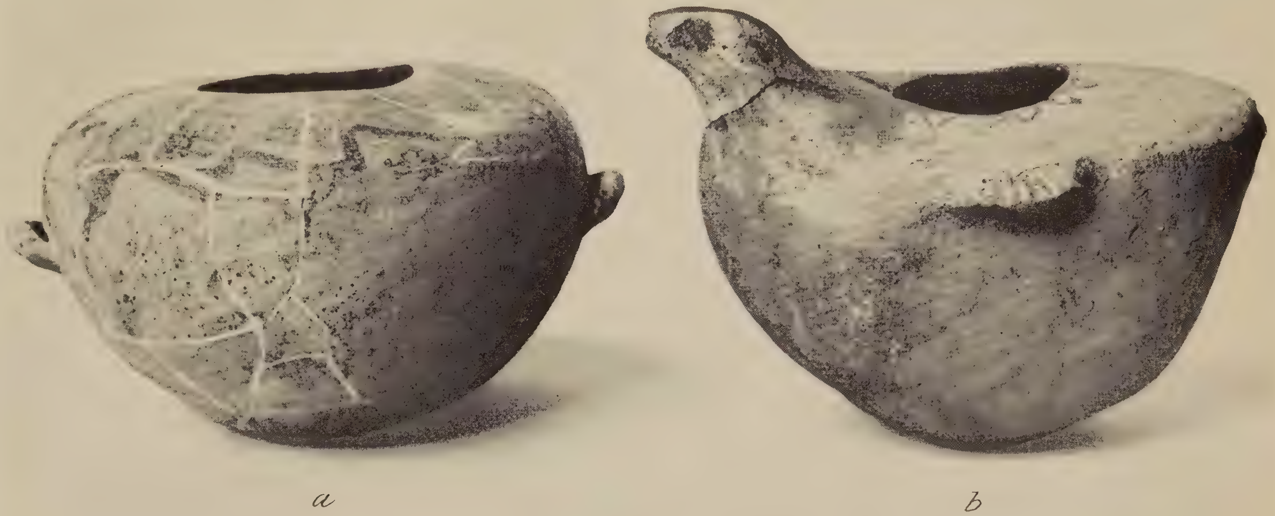
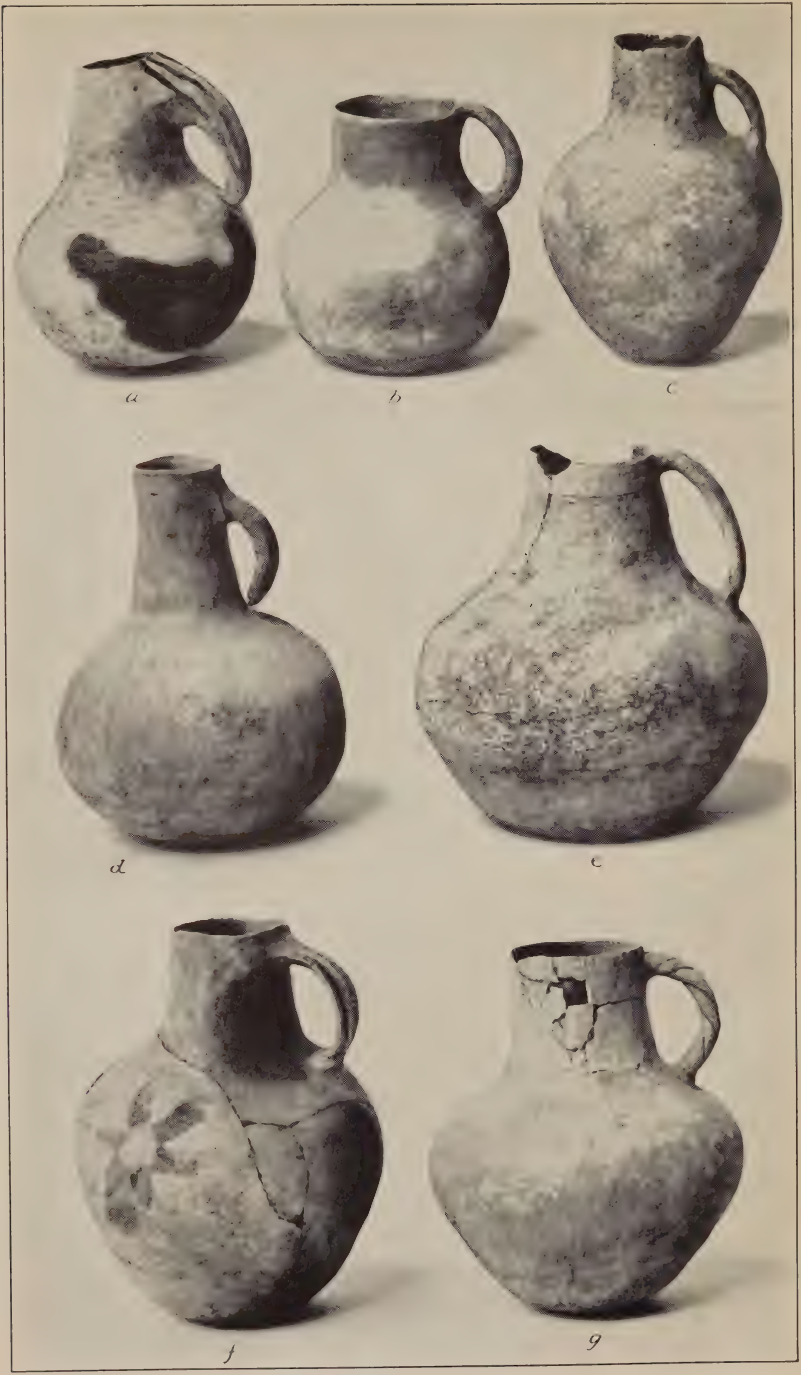


FIGURE 18.—Varieties of pitcher forms

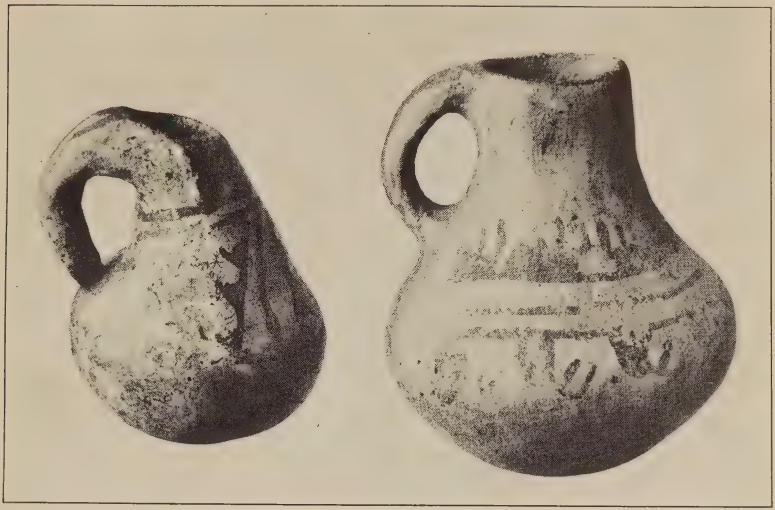
An interesting point is raised by these objects. Do they represent the old, original form of pitcher, the prototype patterned after vege-



SEED JAR AND DUCK VESSEL



PITCHER FORMS



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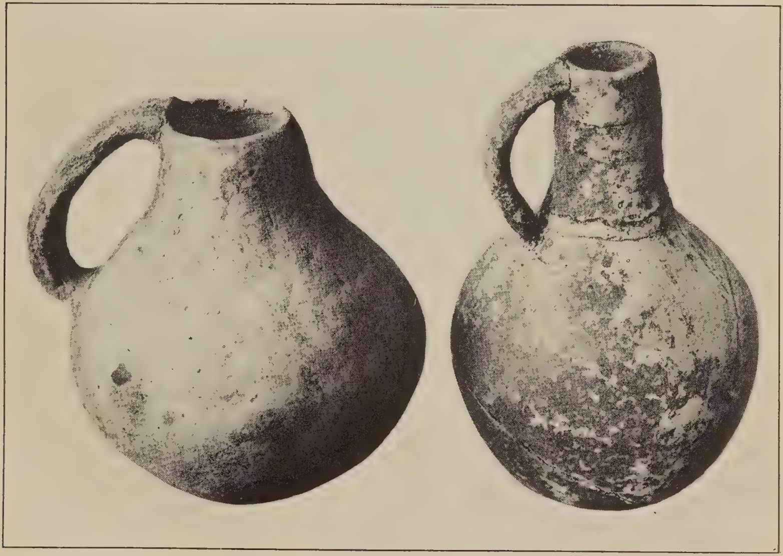
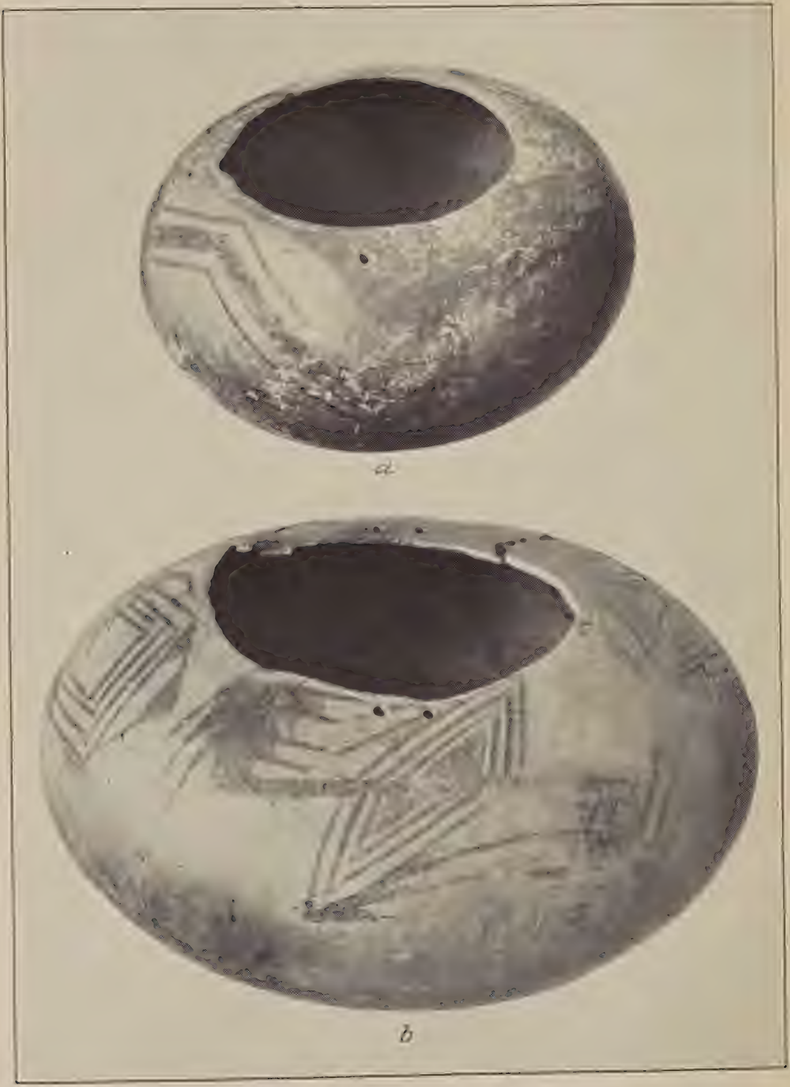


Undecorated

TYPES OF SMALL PITCHERS



BLACK-ON-RED SEED JARS

tal models, as has long been held by some students of southwestern ceramics, or are they a special form appearing only after the manufacture of pottery was well established? Present evidence suggests that the latter was the case. Pitchers had been made for a considerable period of time before the actual gourd forms were modeled. The latter so far have been reported only from Pueblo I and later sites. Superficially the types of pitchers found in both the late Basket Maker and early Pueblo periods resemble gourds with the stem-bearing tips removed and it is possible that they were so suggested. On the other hand, the influence may have been an indirect one. There is a marked similarity between many of the southwestern basketry water bottles of early periods and the pitcher forms. The basket containers are, in many instances, thought to have been patterned after vegetal models, and inasmuch as basketry had so decided an influence on ceramics the pitcher shapes may well be a survival of those forms rather than the result of an actual copying of gourd forms.[77] This would illustrate the transference of an established functional form from one medium to another. This would seem to be a more plausible explanation for the origin of the shapes than to hold that immediately upon the discovery of the pottery-making art the ceramists, in casting about for something to pattern their vessels after, searched other fields for their models. In any case, the conventional form was the first to appear, and then came the true imitation.

Handles on the pitchers are generally of the vertical loop variety, roughly circular or oval in cross section. Sometimes the fillets of clay were twisted and again two loops placed side by side were used. An occasional handle of the strap form is to be observed. The handles were attached to the neck either at the rim or slightly below it. Their juncture with the body is usually at a point just above the line of greatest diameter or shoulder. On some of the pitchers the handle is not fastened to the body but only touches it (fig. 18, *f*, *g*); possibly reflecting some influence from the actual gourd forms.

As a whole the pitchers of the Pueblo I period are more graceful in form and show an improvement in symmetry over those of the preceding period. Their surface finish is much better and is comparable to that of the other vessels. This is in decided contrast to the late Basket Maker pitchers which are characterized by the extreme roughness of their surfaces.

Pitcher sizes vary to the same extent as do those of the other vessel forms. The group illustrated in Figure 18 is so characteristic of the general size range that measurements of each one represented will be sufficient to show the gradation in the specimens of the collection.

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[77] Cushing, F. H., 1886, pp. 482–493.

Figure 18, *a*, has a total height of 12$\frac{1}{16}$ inches (30.6 cm.) and a body diameter of 9$\frac{7}{16}$ inches (24 cm.). The neck height is 3⅛ inches (8 cm.) and its diameter at the orifice 3¾ inches (9.6 cm.). The handle is of the strap variety and averages three-eighths of an inch (1 cm.) in thickness and 2 inches (5.1 cm.) in width.

The total height for *b* is 10 inches (25.4 cm.) and its body diameter 8$\frac{9}{16}$ inches (21.8 cm.). The neck height is 3$\frac{9}{16}$ inches (9.1 cm.) and the diameter of the orifice is 3$\frac{15}{16}$ inches (10 cm.). The handle joins the neck seven-sixteenths of an inch (1.1 cm.) below the rim. The handle is of the strap variety, three-sixteenths of an inch (5 mm.) thick and 1$\frac{7}{16}$ inches (3.7 cm.) in width.

The height of *c* is 9¼ inches (23.4 cm.) and its body diameter 8¾ inches (22.2 cm.). The neck height is 3¼ inches (8.3 cm.) and the diameter of the orifice 3⅛ inches (8 cm.). The handle, which is of the oval type, is three-eighths of an inch (1 cm.) thick and 1 inch (2.54 cm.) wide. It was attached to the neck at the rim.

One of the largest pitchers found was Figure 18, *d*. Its height is 10$\frac{15}{16}$ inches (27.8 cm.) and the average diameter of the body 9$\frac{9}{16}$ inches (24.3 cm.). The neck height is 3¾ inches (9.6 cm.) and the average diameter of the orifice 4⅜ (11.1 cm.). The handle, which is of the single loop twisted variety, joins the neck practically at the rim. It is nine-sixteenths of an inch (1.5 cm.) thick and three-fourths of an inch (1.9 cm.) wide.

The pitcher outlined in *e* has a height of 7⅞ inches (20 cm.) and a body diameter of 6$\frac{1}{16}$ inches (15.4 cm.). The neck height is 2 inches (5.1 cm.) and the orifice diameter 2⅜ inches (6 cm.). The handle is of the oval form and is attached to the neck five-eighths of an inch (1.6 cm.) below the rim of the orifice. The handle thickness is seven-sixteenths of an inch (1.1 cm.) and the width seven-eighths of an inch (2.25 cm.).

The long-necked pitcher, *f*, has a height of 9$\frac{3}{16}$ inches (23.3 cm.) and a body diameter of 7⅛ inches (18.1 cm.). Its neck height is 3$\frac{11}{16}$ inches (9.4 cm.) and the diameter of the orifice 2¼ inches (5.7 cm.). The handle is three-eighths of an inch (1 cm.) below the rim, is thirteen-sixteenths of an inch (2.1 cm.) thick, and eleven-sixteenths of an inch (1.8 cm.) wide.

The smaller pitcher of the same form, *g*, is 5$\frac{15}{16}$ inches (15.1 cm.) in height and the body diameter averages 3$\frac{13}{16}$ inches (9.7 cm.). The neck height measures 2$\frac{5}{32}$ inches (5.5 cm.) and the diameter of the orifice is 1¼ inches (3.2 cm.). The handle is attached to the neck at the rim. It measures one-fourth of an inch (6.4 mm.) in thickness and nine-sixteenths of an inch (1.4 cm.) in width.

The straight-necked form, *h*, is $7\frac{9}{16}$ inches (19.2 cm.) high and has a body diameter of 6 inches (15.24 cm.). The neck height measures $2\frac{9}{16}$ inches (6.5 cm.) and the diameter of the orifice is 3½ inches (8.9 cm.). The handle is joined to the neck seven-sixteenths of an inch (1.1 cm.) below the rim. The handle is nine-sixteenths of an inch (1.4 cm.) thick and 1 inch (2.54 cm.) in width.

The smallest of the gourd forms, *i*, is 3¾ inches (9.5 cm.) in height and has a diameter in the body portion of $3\frac{3}{16}$ inches (8.1 cm.). The neck is difficult to determine, but it has an approximate length of 2⅜ inches (6.1 cm.). The diameter of the orifice is 1 inch (2.54 cm.). The handle is so tapering that measurements of it are not practical.

The larger of the gourd forms, *j*, has a 7⅝ inches (19.4 cm.) height. The average body diameter is $6\frac{1}{16}$ inches (15.4 cm.). The neck height is more easily determined on this specimen. It is 3⅜ inches (8.6 cm.). The orifice diameter is 2¼ inches (5.7 cm.). The hollow handle on this pitcher is also tapering and measurements are difficult to determine. At the center it is thirteen-sixteenths of an inch (2.1 cm.) thick and 1 inch (2.54 cm.) wide. Other examples of this form of pitcher range between the two extremes in size here given.

Bowls in the nonculinary group are not characterized by a great variety of shapes. In general it may be said that there are three forms. The great majority of the vessels of this class are fairly deep in proportion to their diameter and closely border on the hemispherical shape. (Fig. 19, *a*.) Most of them have rounded bottoms, many showing traces of the basket in which they rested while in the process of manufacture, while the remainder have slightly flattened bases. The second form, *b*, is too deep to be considered a hemispherical type. Some of the vessels in this group are, in fact, almost straight sided. Bowls of this form constitute but a small percentage of the group, however. The third form, *c*, is of a shallow variety, the depth of the bowl being markedly less than half of the diameter. Most of the black-on-red bowls fall into this group, although the black-on-white ware is well represented in it.

Regardless of shape, there are certain features which are characteristic of the bowls. There is a greater amount of asymmetry in these vessels than in any other form. For some reason there was a more pronounced tendency for the bowls to warp, possibly due to a faulty mixing of the paste. Hence, the containers are rarely a good circular form. They tend more to elliptical and oval or egg-shaped contours. In a few instances the warping resulted in what is known as the conventional heart-shape. This asymmetry is so apparent in the illustrations of the bowls (pls. 25–31), however, that further discussion of it is not necessary. The rims on the vessels are in most cases rather uneven or wavy. They may be considered as being of the direct variety, for outcurved or incurved rims have not been found. The lips of the rims are either rounded or slightly flattened. The vessel walls are somewhat thin for a short distance below the rim in a majority of the specimens; in fact they may be said to taper in to the lip. The interior of the bowls characteristically is more carefully smoothed than the exterior. This may be accounted for on the grounds that the field for decoration occupied the attention of the maker to the exclusion of the other portions of the vessel.

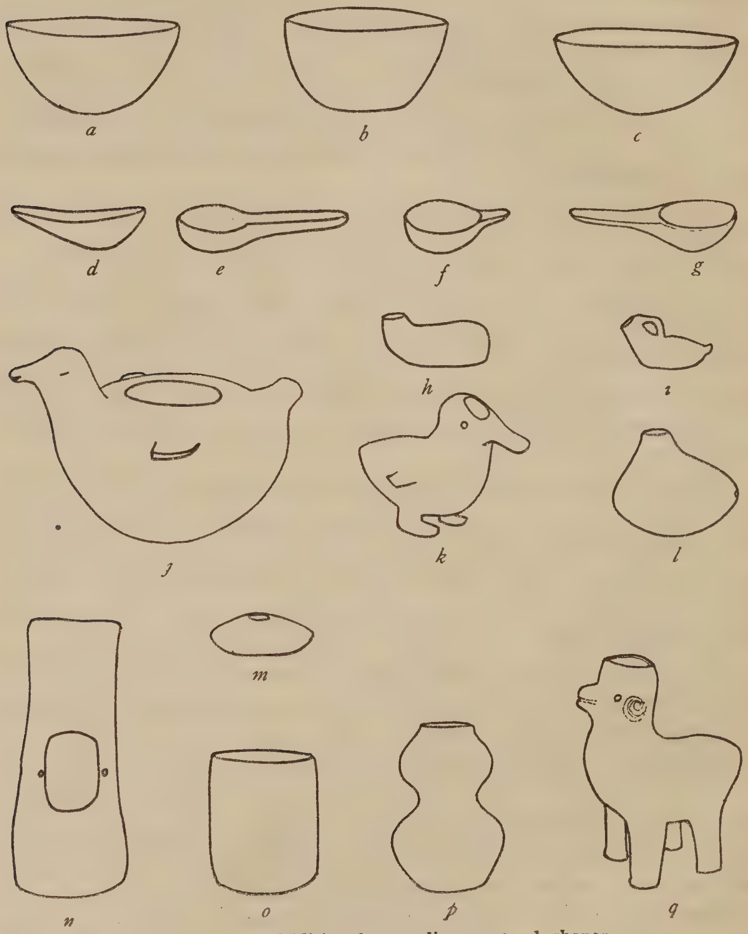
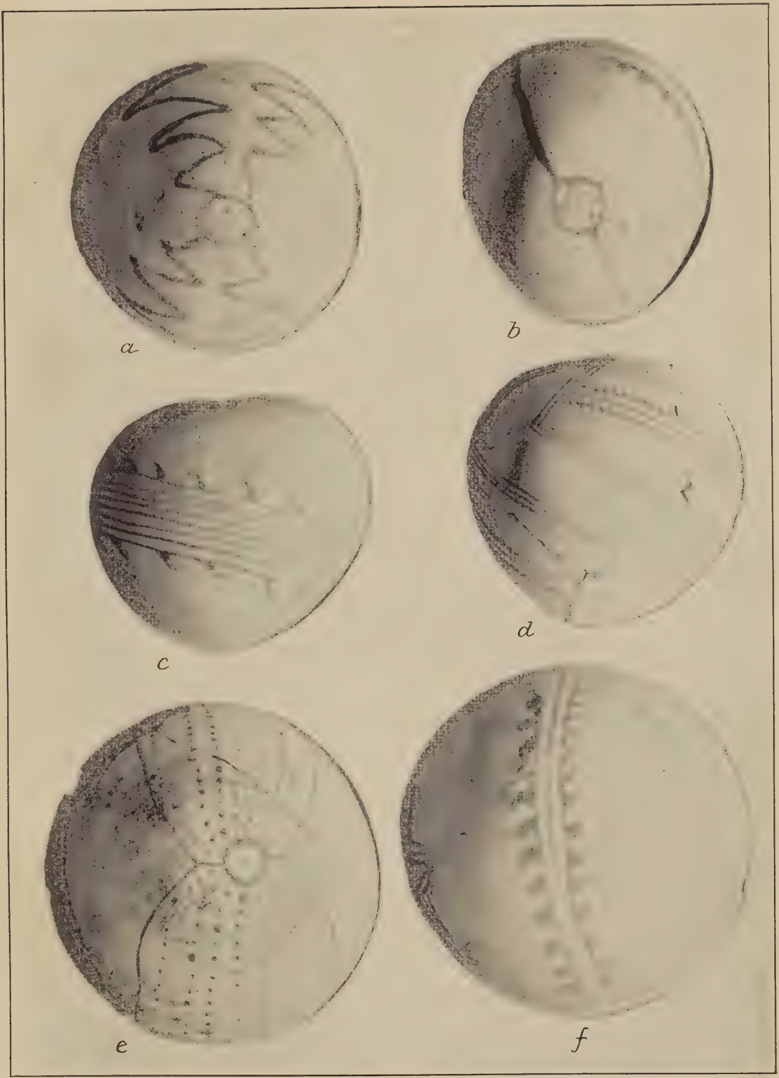
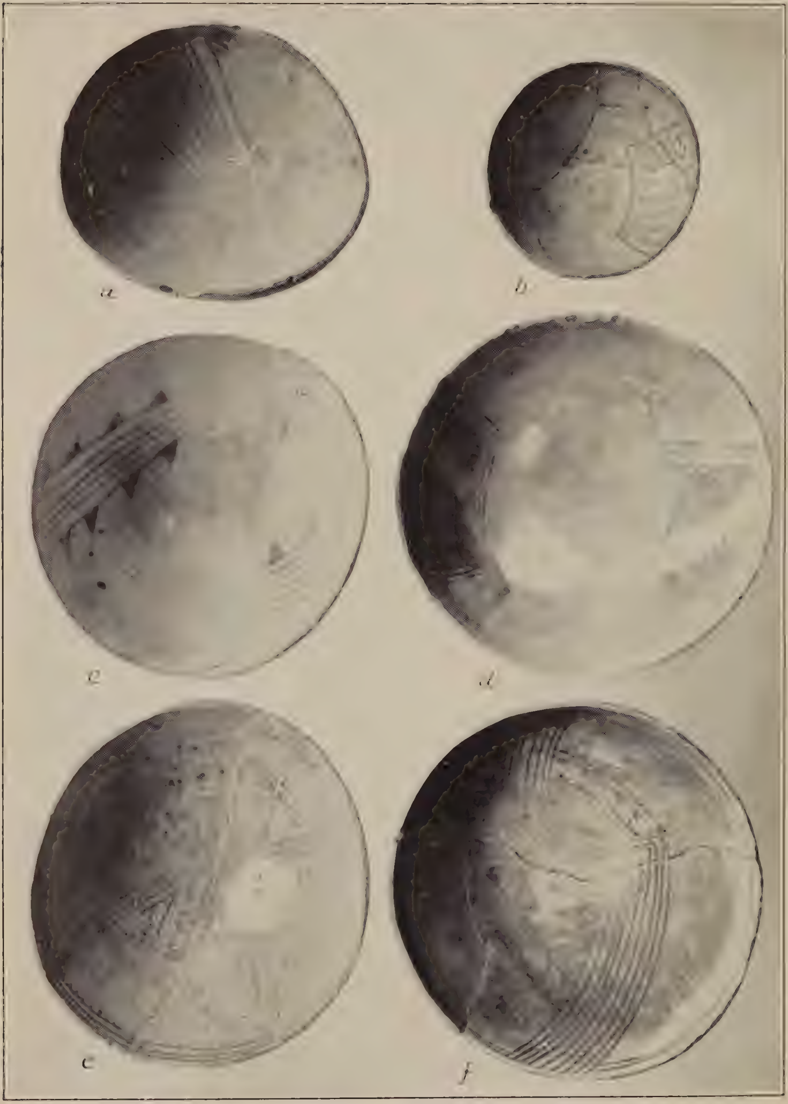


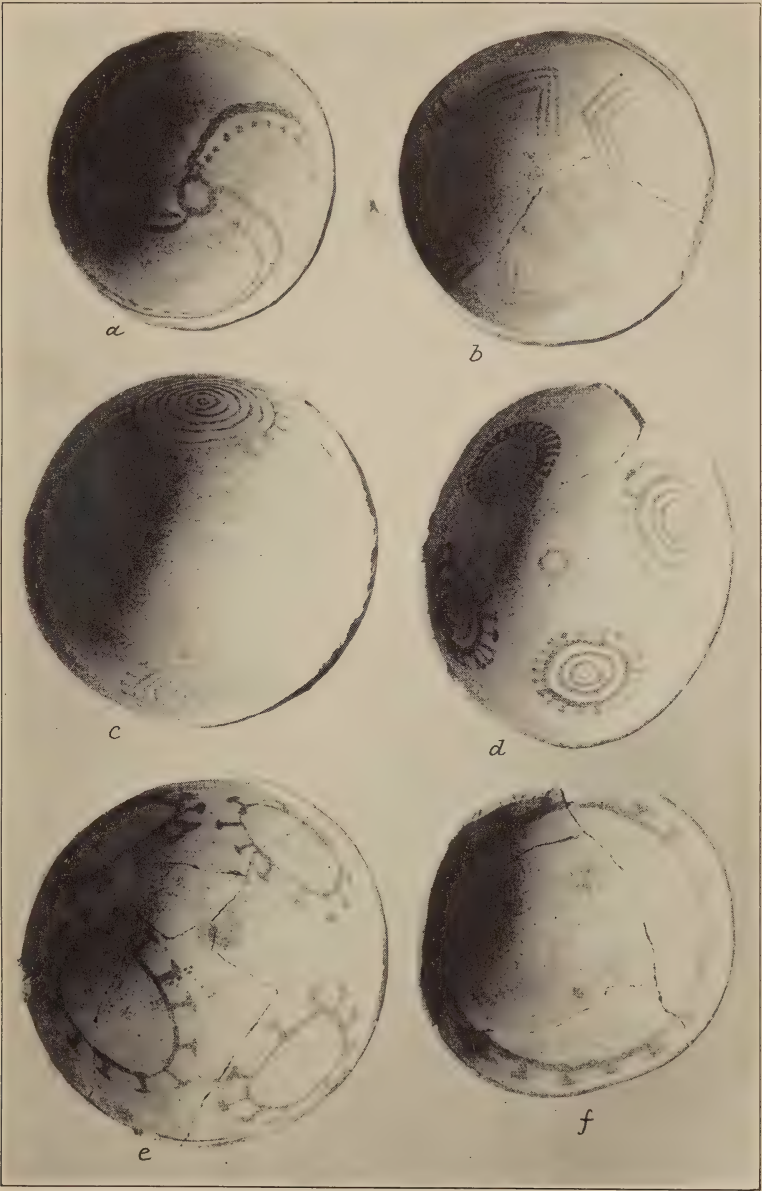
FIGURE 19.—Additional nonculinary vessel shapes



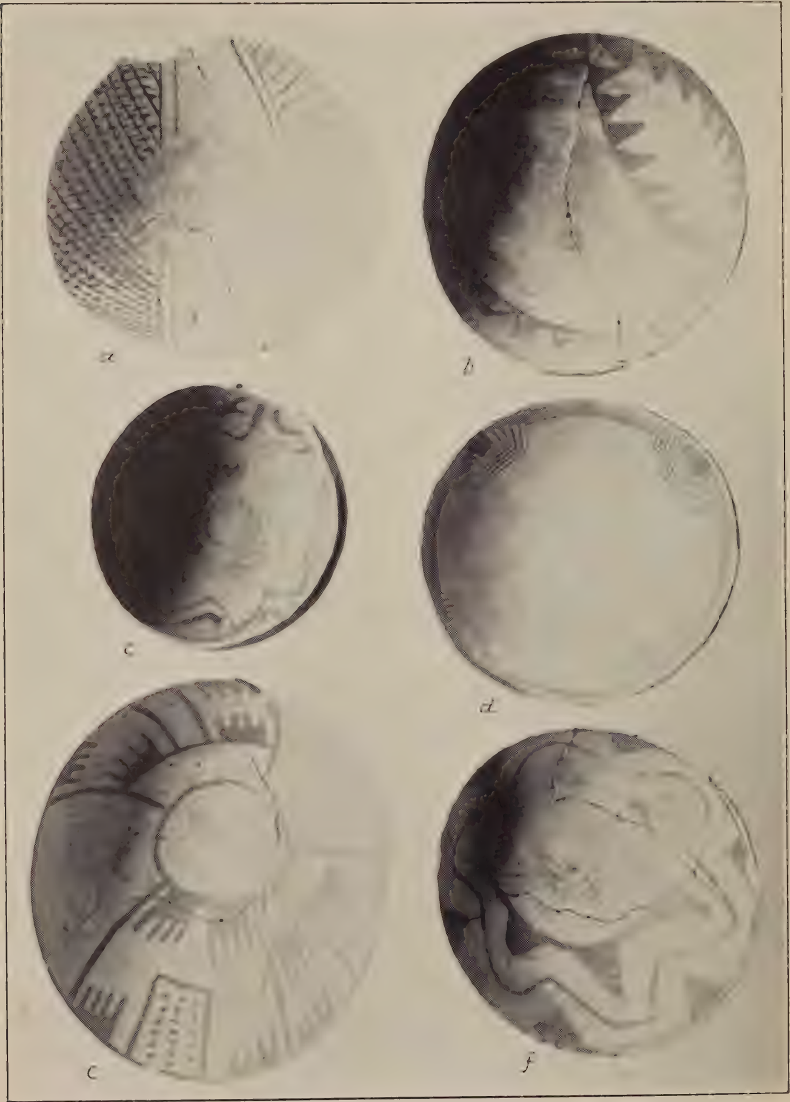
BLACK-ON-WHITE BOWLS SHOWING INTERIOR DECORATION



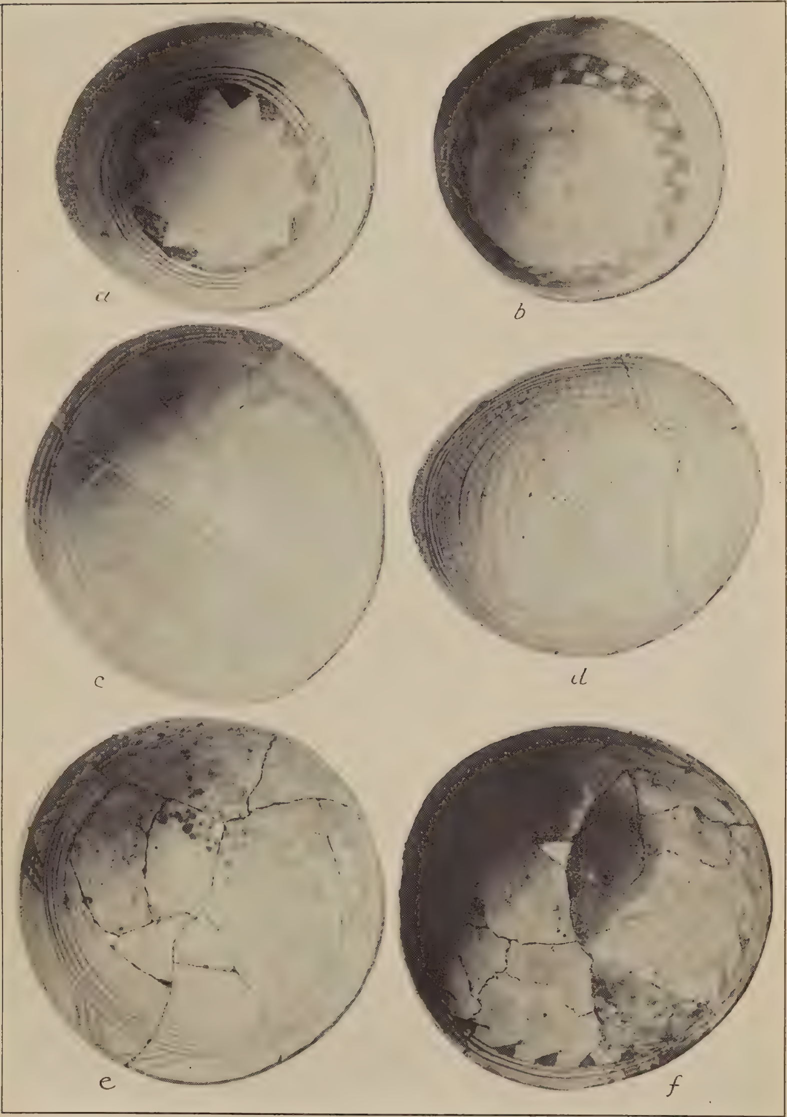
BOWL INTERIORS, BLACK-ON-WHITE GROUP



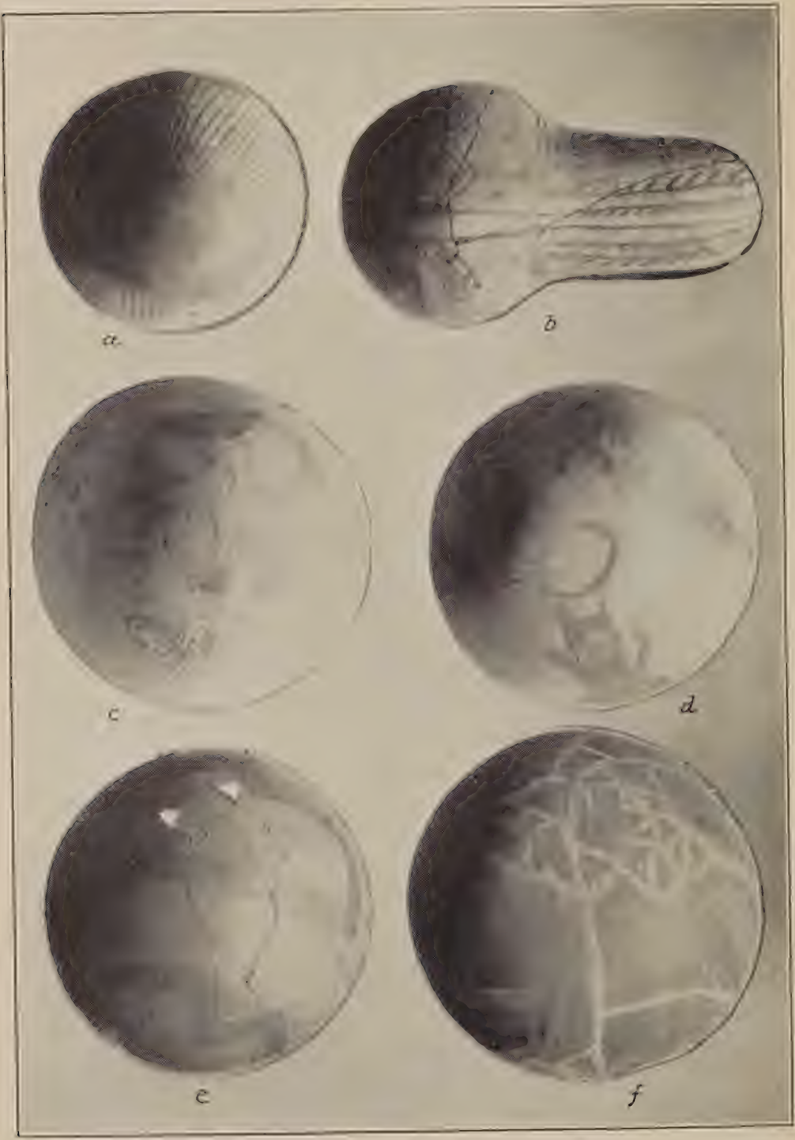
BLACK-ON-WHITE BOWLS



BOWL INTERIORS, BLACK-ON-WHITE VESSELS

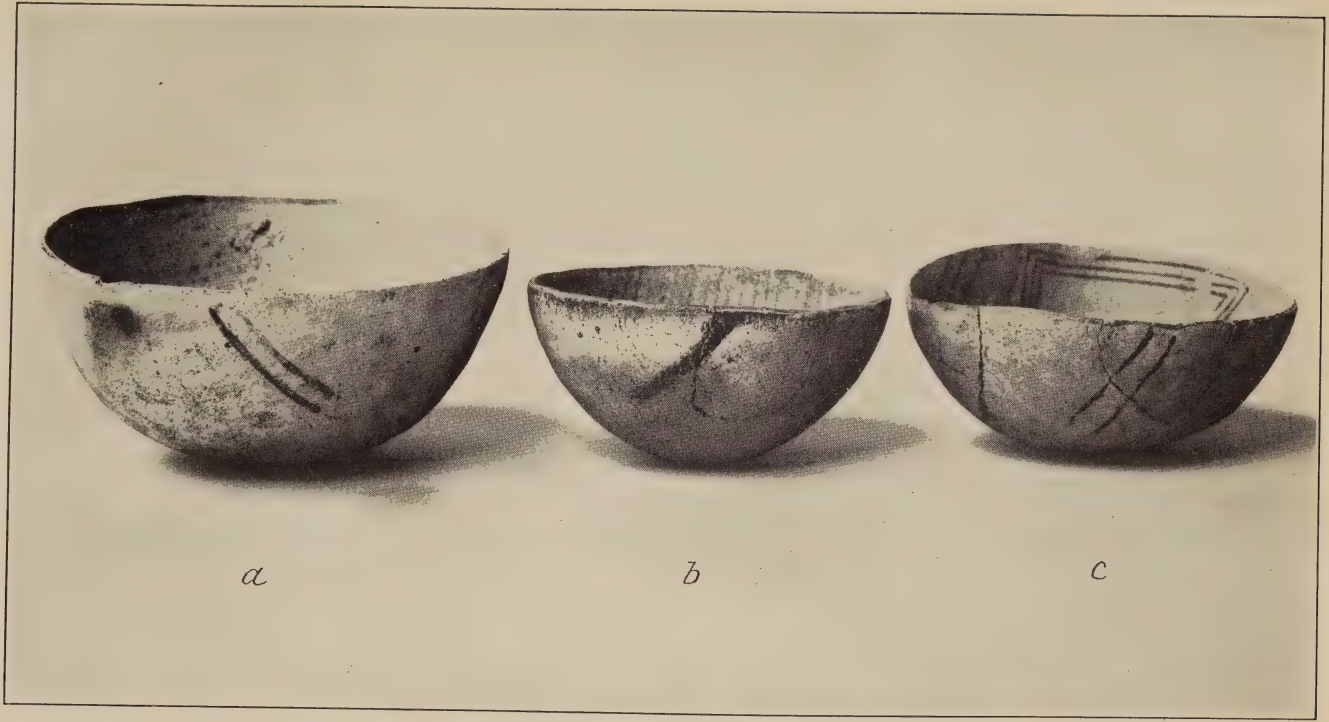


EXAMPLES OF BAND DESIGNS ON BOWLS OF THE BLACK-ON-WHITE GROUP

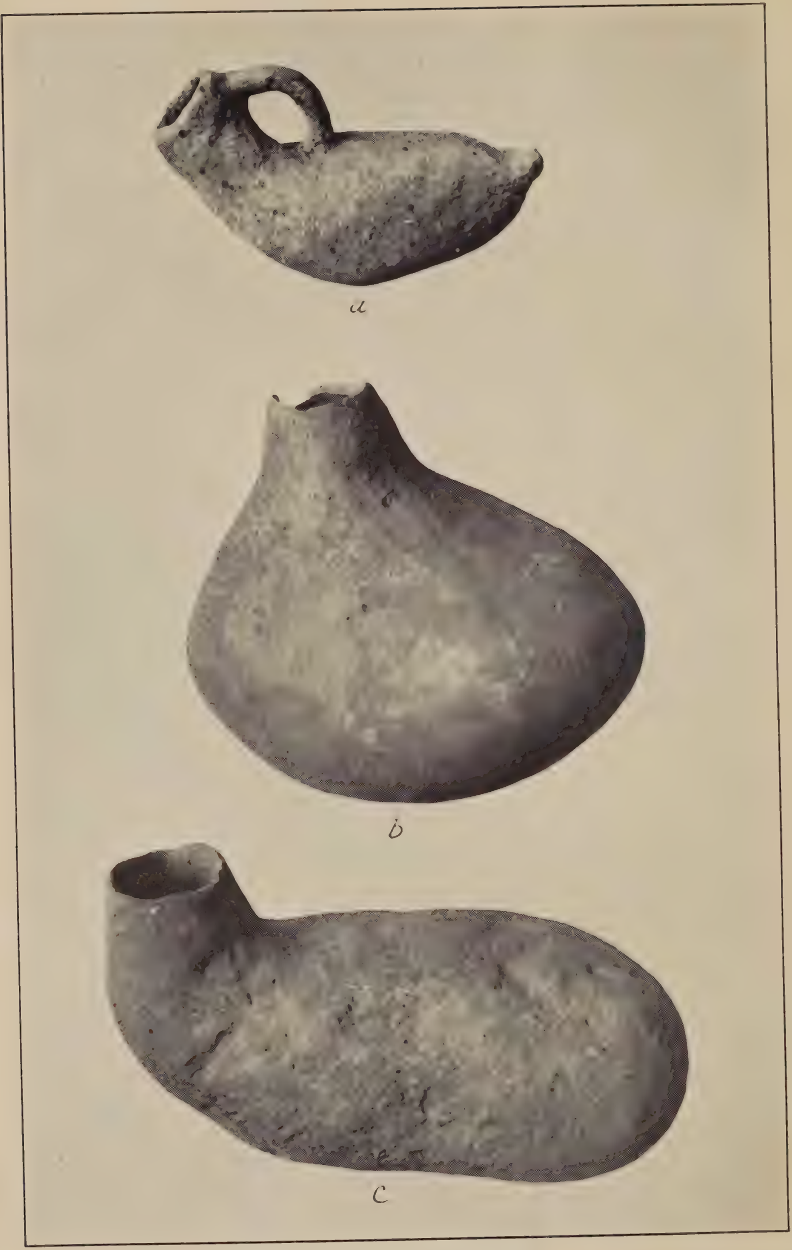


BOWLS AND LADLE

e and *f* black-on-red vessels.



EXAMPLES OF LINES PAINTED ON BOWL EXTERIORS



BIRD-FORM VESSELS

An occasional specimen is found with handles, but this is a comparatively rare feature. One example has a single hooklike lug attached to one side slightly below the rim; another has two small vertically perforated lugs on opposite sides close to the bottom; some exhibit the small shelf-like projections suggestive of stubby bird tails; others have simple cone-shaped knobs.

Bowl sizes show a considerable range. The smallest serviceable forms have diameters of 4½ inches (11.43 cm.) and a depth of 2¼ to 2½ inches (5.7 to 6.35 cm.) and the largest, excepting the tublike forms discussed in the culinary group where their measurements were given, a diameter of 9⅝ inches (24.5 cm.) and a depth of $5\frac{5}{16}$ inches (13.5 cm.). The great bulk of the bowls fall into the diameter range of 6 to 8 inches (15.2 to 20.3 cm.) and a depth variation of from 2¾ to 3½ inches (7 to 8.9 cm.). The average wall thickness of the entire group shows but a slight fluctuation from three-sixteenths of an inch (5 mm.).

Dippers and ladles show some differences in form, but they constitute a very small proportion of the nonculinary wares. The simplest shape is that of a shallow scoop. (Fig. 19, *d*.) This shape may be likened to a half melon or gourd. The horizontal contour is decidedly egg-shaped. This type of ladle is generally found in association with the early Pueblo horizons. The second form is characteristically that of a half gourd of the long-necked variety. (Fig. 19, *e*; pl. 30, *b*.) There is no division or break between the bowl and handle portions. The third form is a modification of the second. It consists of a bowl and a handle, but the two are separated by a thin partition wall. (Fig. 19, *f*.) The fourth form, *g*, has a solid handle. Ladles of this group suggest the preceding form, with the additional filling in of the handle portion so that it becomes a solid object. The form is distinct from the bowl with handle-attached types found in later periods.

The handle lengths on both *f* and *g* may vary considerably. Some specimens will show the reverse of the conditions here illustrated. Several have been found with the short, stubby, paddlelike handle solid instead of being a continuation of the bowl separated from it by a thin partition, while others have a long handle of the *g* style which is partitioned off from the bowl by an intervening strip of clay which completes the circumference of the cup portion. An unusual double-bowled ladle with a short, solid bifurcated handle was found on the site of the A village in the preliminary investigations during 1923.[78] A good example of the concave handle, partition form, from the district is illustrated in the report on the Colorado institution's first year's investigations.[79] Dippers and ladles on the whole occur so seldom in the pottery forms of the Pueblo I period along the Piedra that the lack of them might paradoxically be said to be one of their characteristics.

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[78] Roberts, F. H. H., jr., 1925, p. 46, pl. 21.

Fragments from the *d* forms, Figure 19, indicate that they have a length range of from 4½ to 5½ inches (11.43 to 14 cm.). The diameter of the bowls varies from 2 to 3 inches (5.1 to 7.62 cm.). The range in bowl depth is between 1 inch (2.54 cm.) and 2½ inches (6.35 cm.).

The half-gourd-shaped ladle (fig. 19, *e*) has a total length of 9¾ inches (24.8 cm.) and a bowl diameter of 5½ inches (14 cm.). The depth is 2 1/16 inches (6.8 cm.). Other examples of the form are too fragmentary to measure.

The third type, *f*, was in general quite small. The bowl portions range from 2⅞ inches (7.3 cm.) to 3½ inches (8.9 cm.) in diameter and from 1 3/16 inches (3 cm.) to 1⅜ inches (3.5 cm.) in depth. Handle lengths vary from 1 3/16 inches (3 cm.) to 2⅝ inches (6.7 cm.). Widths vary from nine-sixteenths of an inch (1.4 cm.) to 1⅝ inches (4.1 cm.). The average handle thickness is five-sixteenths of an inch (8 mm.).

The last form illustrated, *g*, has a 6½-inch (16.5 cm.) length. Of this total 4 inches (10.16 cm.) is handle. The average bowl diameter is 2½ inches (6.35 cm.) and the depth 1⅝ inches (4.2 cm.).

Bird-form vessels furnish an interesting feature in the ceramic group. They first appeared in the closing days of the late Basket Maker period and seem to have attained their greatest prehistoric prominence in that of Pueblo I. They are rare in Basket Maker III and although found in later horizons apparently did not occur to as great an extent as in the initial Pueblo stage. In the modern period a vast number of bird-shaped vessels have been made. This is particularly true of Zuñi, but because of the kinds of birds represented the feature seems to be largely the result of post-Spanish influences. Prehistoric specimens from the region show approximately the same proportion of the bird forms as found elsewhere.

The shapes in the Piedra collections vary from those which merely indicate the plump, oval body of a bird (fig. 19, *h*, *l*) to actual effigies of them (fig. 19, *k*). Between these two extremes are many vessels with various features suggestive of the bird. On some there are the wings and the tail, on others just a tail. (Fig. 19, *i*.) Still others have bodies which are characteristically of the seed-jar form but which have a head, stubby wings, and tail of a bird. (Fig. 19, *j*; pl. 21, *b*.)

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[79] Jeancon, J. A., 1922, pl. xxi, *d*.

Most of these forms from the Piedra district are extremely suggestive of ducks. The effigy vessel unquestionably represents that fowl. Just what significance they may have had is unknown, but it is possible that they were of ceremonial importance. When the effigy was found it was filled with finely ground corn, possibly sacred meal such as is used in many of the modern ceremonials. The seed jar with head, wings, and tail illustrated in Plate 21, *b*, was filled with quartz crystals. The small number of vessels of this kind in proportion to the other shapes indicates that they were not in common everyday use. A suggestion as to a possible explanation for the form is to be found in one of the myths of the Zuñi. The story is one phase of the tale which describes the wanderings of the people and their tribulations before they finally settled in the valley where their present village is located. Too much reliance should not be placed on the myths and traditions of the modern Pueblos in seeking explanations for the ancient cultures, but in the present instance at least an interesting sidelight is thrown upon the possible significance of the bird-form pottery.

The myth mentioned relates that one of their important ancestral personages was lost in the land of snow and cold in the far northwest; and, as he wandered blindly about, calling loudly for assistance, a duck heard him and came to his rescue. Eventually, after a series of misfortunes and with the aid of other creatures, the fowl led him first to the Spirit Lake, sometimes called the Lake of the Dead, where those who had been lost in the migration of the people lived. Thence he was carried, still accompanied by the duck, to the village where the Zuñi had settled.[80] The journey of this mythological personage from the Spirit Lake to the Pueblo is reenacted every four years, when the young boys are initiated into the rites which assure their joining, after death, the ancestral group in the Lake of the Dead. During the ceremonies the story of the personage who was lost in the north and of the duck which befriended him is related.[81] A part of the ceremonial paraphernalia used in the observances includes a stuffed duck. The latter fowl is considered by the Zuñi as the wisest and most knowing of all creatures in the subject of travel routes. It may well be that the pottery representations of that particular bird found in the beginnings of the Pueblo cultures symbolized some such mythological event.

The vessel illustrated in Figure 19, *l*, and Plate 32, *b*, is of considerable interest. The general outlines are characteristically of the plump body of a bird. There is a short neck with a small orifice where the neck of the bird would be. At what would be the posterior or tail end of the body in the approximate position of the cloaca there is a perforation through the side of the vessel. Mr. Morris found a number of vessels of this type in his work farther west and south, and he suggests that they represent a modified form of the vessels with lateral spouts, which are found only in the Basket Maker III period.[82] He further mentions the possibility that bone tubes were set in the openings, with pitch, to take the place of clay spouts on the prototypes. Although there is probably no significance attached to it, these forms have the peculiar attribute of emitting a shrill whistling sound when placed in such a position that the wind blows against the lateral opening. Because of this characteristic they have occasionally been referred to as whistling jars.

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[80] Cushing, F. H., 1896, pp. 407–414.

[81] Stevenson, M. C., 1887, pp. 544–545.

The most consistent form in the group, from the standpoint of distribution, appears to be that of *i*, Figure 19; Plate 32, *a*. Mr. Morris found them in the La Plata Valley and Navaho Reservation sites,[83] and Doctor Fewkes obtained one from Pipe Shrine House on the Mesa Verde.[84] They are quite frequent in slightly modified forms in later periods.[85] An occasional variation of *j* is secured and *h* also is found in later horizons. One example of the latter in a late prehistoric site was found by Doctor Fewkes at Chevlon Ruin in the upper Little Colorado region.[86] Numerous other bird forms are found in the upper Gila region[87] and along the Rio Grande,[88] but all are from ruins of periods subsequent to that of the Piedra-La Plata specimens.

Sizes vary. The jars with head, tail, and wings (fig. 19, *j*; pl. 21, *b*) are approximately the same size. The body height for *j* is 9 inches (22.86 cm.) and the diameter of the body 10 inches (25.4 cm.). The head rises 2½ inches (6.35 cm.) above the top of the jar. Other measurements are not available. The specimen, Plate 21, *b*, is 12 inches (30.48 cm.) from breast to tail and 8½ inches (21.6 cm.) from wing to wing. From wing tip to wing tip, however, is 10¼ inches (26.11 cm.) The body is 7½ inches (19.1 cm.) in height. The head rises 2 inches (5.1 cm.) above the top of the jar. The head, in its present condition with the beak broken off, measures 2½ inches (6.35 cm.) in length. The wings are 2 inches (5.1 cm.) long and seven-eighths of an inch (2.3 cm.) wide. They average one-fourth of an inch (6.4 mm.) in thickness. The orifice in the top of the jar is 3½ inches (8.9 cm.) in diameter.

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[82] Morris, E. H., 1927, p. 180.

[83] Morris, E. H., 1927, p. 165; 1919 b, pl. 71, a.

[84] Fewkes, J. W., 1923 a, fig. 107, *e*.

[85] Holmes, W. H., 1886, figs. 354–358.

[86] Fewkes, J. W., 1904, p. 67.

[87] Hough, W., 1907, pl. VII.

[88] Hewett, E. L., 1906, pl. XIV, c; Jeancon, J. A., 1923 b, pl. 38.

The form *h* has a length of $4\frac{1}{8}$ inches (10.5 cm.), a width of $2\frac{13}{16}$ inches (7.2 cm.), and a height of $2\frac{3}{4}$ inches (7 cm.). The orifice is oval in contour with diameters of 1 inch (2.54 cm.) and five-eighths of an inch (1.6 cm.). (Pl. 32, *c*.)

The total length of *i* is $3\frac{3}{8}$ inches (8.6 cm.) and the height $2\frac{1}{8}$ inches (5.3 cm.). The orifice has a diameter of five-eighths of an inch (1.6 cm.).

The effigy form, *k*, stands 5 inches (12.7 cm.) high and measures $4\frac{1}{2}$ inches (11.43 cm.) from breast to tail. Additional measurements for this vessel are not available, as it is in the State Museum at Denver, Colo.

The last of the group, *l*, has a total height of $3\frac{7}{8}$ inches (9.8 cm.). The breast to tail measurement is $4\frac{9}{32}$ inches (10.9 cm.) and from side to side the body is $3\frac{5}{8}$ inches (9.3 cm.). The orifice is seven-eighths of an inch (2.2 cm.) and the perforation at the end three-eighths of an inch (1 cm.) in diameter.

Among the unusual forms is a group of ellipsoid-shaped vessels. (Fig. 19, *m*.) What their function may have been is not known. They were not numerous, only a half dozen having been found in the section, and none are very large. The body is long and narrow, the ends tapering and rounded, and there is a small oval orifice in the top. Now and then a specimen has a low, squat neck, but these forms are rare. The form in general occurs sporadically throughout the San Juan area in about the same proportion as observed along the Piedra. The only specimen which is sufficiently intact to warrant measurements has a length of $5\frac{1}{8}$ inches (13 cm.) and a body diameter, through the center, of $2\frac{3}{16}$ inches (5.5 cm.). The orifice has its long axis coinciding with the long axis of the vessel. It measures $1\frac{1}{4}$ inches (3.2 cm.). The short axis is three-fourths of an inch (1.9 cm.). The average wall thickness is one-fourth of an inch (6.4 mm.).

One of the most unusual forms found during the investigations and one which thus far is unique in the pottery of the San Juan area was that of a large black-on-red jar with a lateral orifice. (Fig. 19, *n;* pl. 33, *b*.) What the purpose of this vessel may have been is purely conjectural. At first glance it suggests the so-called feather boxes of the modern Pueblos, and also the analogous prehistoric form,[89] made from cottonwood. It differs from the latter, however, in that it has a marked tapering to the body and apparently was made to stand upright, as indicated in the drawing. Furthermore, the opening in the side is smaller than that usually found in the "feather boxes." The general shape and size of the pottery jar is very similar to that of many of the cylindrical vases from the Chaco Canyon. Here, again, there is a difference in that the openings of the latter are in the top, which in this specimen is closed. There seems little question but what this jar is related in some degree to the Chaco forms. The latter have been considered as being used in ceremonial observances and may have been made for the express purpose of holding ceremonial sticks as a part of the altar paraphernalia.[90] The present example may well represent a modified and perfected form of the wooden feather box. The vases for holding prayer-feather sticks would, functionally, be closely associated with such a form. The latter vases might possibly be the outgrowth of such objects. They will be considered in more detail in connection with the next specimen (fig. 19, *o*), which is characteristically of that form.

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[89] Nusbaum, J. L., 1922, p. 117.

The jar with the lateral opening has a height of 9⅞ inches (25.1 cm.). The diameter at the top is 3⅜ inches (8.6 cm.) and at the bottom 4⅛ inches (10.5 cm.). The opening in the side also tapers from the bottom toward the top. Its width at the bottom is 1¾ inches (4.5 cm.) and at the top $1\frac{9}{16}$ inches (4 cm.). The length of the orifice is $2\frac{15}{16}$ inches (7.5 cm.). The walls of the jar are unusually thin, one-eighth of an inch (3 mm.), but the bottom and top average one-fourth of an inch (6.4 mm.).

The discovery of a small cylindrical vase (fig. 19, *o;* pl. 33, *a*) constitutes one of the high lights of the ceramic contribution from the region. Cylindrical vases have hitherto been considered a form peculiar to the Chaco Canyon, Pueblo Bonito especially, as well as a late development in pottery shapes.[91] To find an example in a Pueblo I site at so great a distance from the locale of the type is of special interest. It shows definitely that such a form was an early Pueblo development. There can be no question of the contemporaneity of this specimen and the early Piedra sites, as it not only has the characteristic ceramic features of the period but was found in house C of the Group 1 unit in the A village. The occurrence of such a form at so great a distance from the main center is not as disturbing as it might seem, since the Piedra section gives such strong indications of affiliations with the Chaco.

Whether the form originated in the northeastern portion of the range of the Chaco cultures and then spread to the main center, where it became a prominent feature, or whether it was the result of an influence from the latter can not be determined from present evidence. The situation as it now stands would suggest that the form was late in the Chaco, since it has been found only under conditions which would place it in the Pueblo III horizon. No example has come from a Pueblo I or II site in the canyon, but the lack of investigations of a comprehensive nature in Pueblo I remains makes it inadvisable to draw definite conclusions at this time. The possibility of its development in the Piedra district was first suggested by Mr. Jeancon.[92] Among the corrugated culinary vessels of the Pueblo II period obtained by the expeditions of the Colorado institutions are a number of the same general shape as the Chaco vases. They differ, however, in that they have rounded bottoms, although some of the Chaco specimens have slightly similar bases, and are of the culinary variety. Since the finding of the black-on-white vase and the quite similarly shaped black-on-red jar, the suggestion of such an origin for the type seems even more plausible.

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[90] Pepper, G. H., 1920, p. 377.

[91] Pepper, G. H., 1920, pls. 2–6; pp. 117–122.

On the other hand, the origin of the form has quite generally been attributed to the Mexican area rather than to the Southwest. The Chaco forms are particularly comparable to the types of cylindrical vases found in the highlands of Guatemala and many have thought that the southwestern forms were the result of a cultural influence from that portion of the higher culture center to the south. That there was commerce, an exchange of objects between the Pueblos and the Mexican area, is shown by the finding of copper bells and macaw skeletons in Pueblo Bonito.[93] With this actual trading of objects it is possible that there may have been an exchange of ideas and that the cylindrical vases were an outgrowth of that factor. The evidence of intercourse between the areas is of so much later a date than that represented by the Piedra forms, however, that considering the problem as a whole it seems more likely that the cylindrical vases, like the making of pottery, were an indigenous development in the San Juan culture area. As to the center of its origin in that range, conclusions must await further developments in the Chaco Canyon itself.

The Piedra specimen is not as large as most of those from the Chaco, but only slightly smaller than the smallest of that group. It is 5¼ inches (13.3 cm.) in height and has a diameter of 4⅛ inches (10.5 cm.). The sides are straight, not incurved or tapering as in many of the larger and later examples. The average thickness of the walls is three-sixteenths of an inch (5 mm.).

The double-lobed jar outlined in Figure 19, *p*, and illustrated in Plate 33, *d*, represents a form which is not unique but which is comparatively rare in collections. Several specimens have been found in the Piedra district and elsewhere as well, but this is the earliest stage in which it appears. Many similar examples are found in later periods. Even the potters of the modern villages make them occasionally, but they simply represent a survival of the shape. Such a jar really represents one globular vessel placed on top of another with the bottom of the upper omitted so that the vessel is actually one container. The present example is rather rough in finish and undecorated. It stands $6\frac{9}{16}$ inches (16.7 cm.) in height. The upper body has a diameter $3\frac{13}{16}$ inches (9.7 cm.) and the lower $4\frac{7}{16}$ inches (11.3 cm.). The orifice diameter is 2 inches (5.1 cm.).

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[92] Jeancon, J. A., and Roberts, F. H. H., jr., 1923, p. 261.

[93] Pepper, G. H., 1920, pp. 194–195.

The mountain sheep effigy (fig. 19, *q*) was found by the writer and his brother during one of the earlier expeditions in the region. Fragments from a number of similar vessels have been found, but thus far only the one complete specimen has been secured.[94] The figure is hollow and at one time had a handle attached to the rear of the head. The handle projected out over the body of the animal. At some time during the period when the vessel was in use the handle was broken off, the remaining stubs were rubbed down and the object continued in service. When found it was serving in the capacity of a mortuary offering. The vessel has a total height of 8¼ inches (20.9 cm.), a length of 6½ inches (16.5 cm.), and measures 4½ inches (11.43 cm.) across the breast. The specimen is in the Colorado State Museum at Denver.

A curious feature of the effigy forms is that the superficial portions, such as the eyes, horns, wings, and tails of the birds, were not molded as a part of the vessel but were stuck on after its completion. Frequently the pellet of clay representing the eyes was incised, some form of sharp instrument having been used to cut into the clay, to make them appear more lifelike. Although there is probably no connection whatever, it is interesting to note that this is the same treatment found in the features on the archaic figurines from the Valley of Mexico.

Pottery effigies were fairly prominent in later Chacoan periods. Some are wholly unidentifiable, but others unquestionably represent deer, frogs, birds, and human beings. Very few complete specimens have been found, but many fragments are in the various potsherd collections from the large ruins.

There is only one vessel found along the Piedra which has not been described and which is not included in the outline drawings. It is a unique specimen and a decidedly eccentric form. (Pl. 33, *c*.) It was molded, not coiled, and has a very crude finish. Possibly it was the work of a beginner in pottery making; perhaps represents the efforts of a child. The form is more suggestive of a modern candlestick than anything else. Its chief value is as a curiosity. The object

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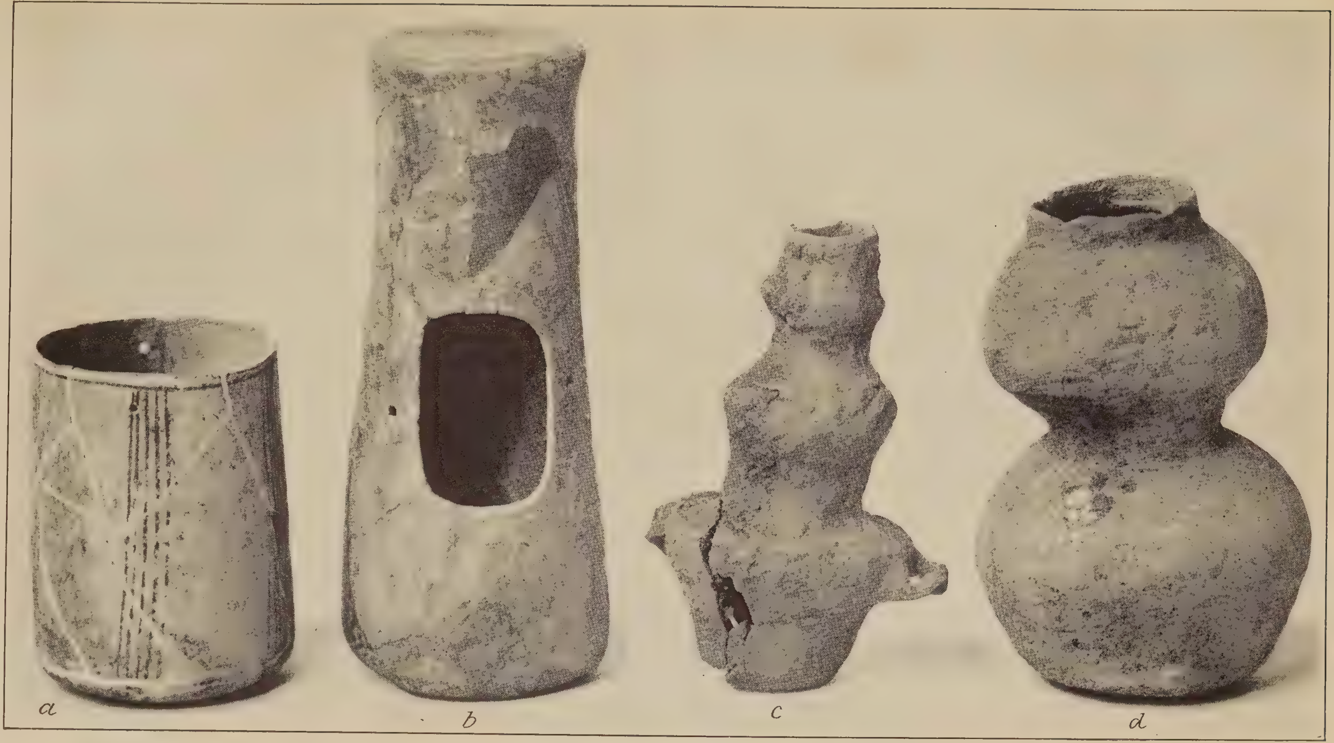
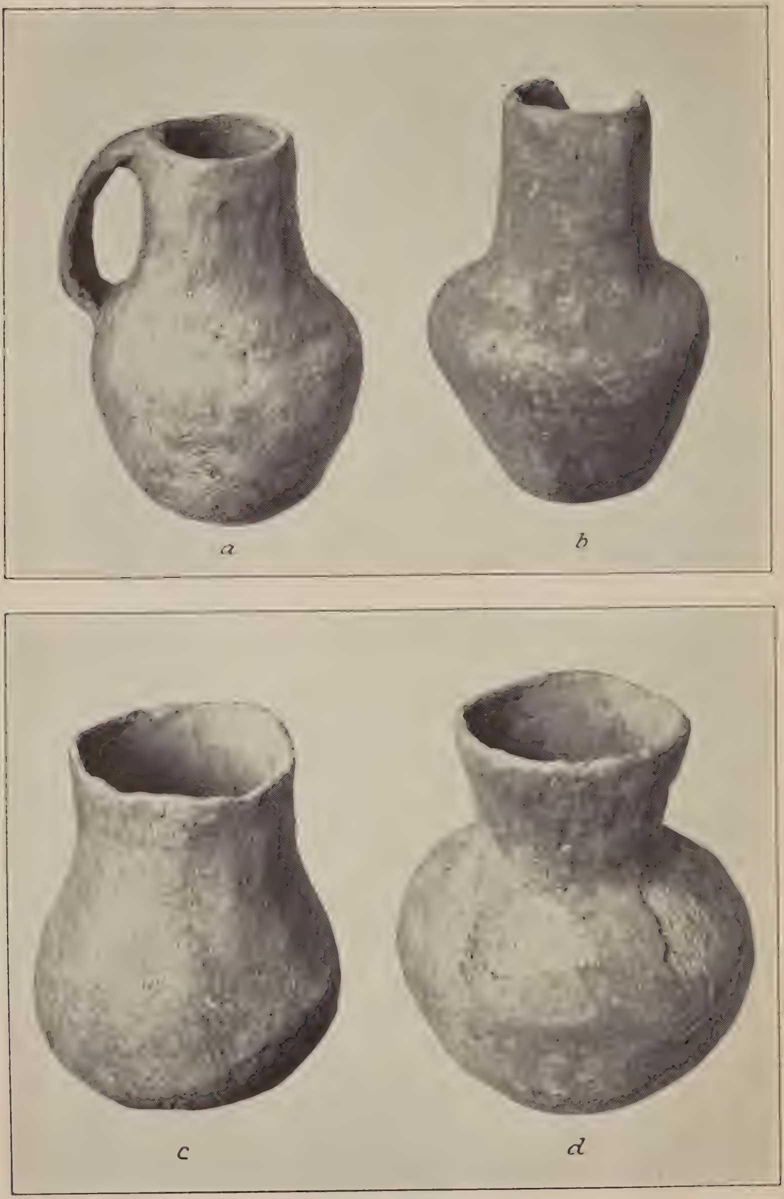
[94] The duck and sheep effigies are illustrated in the report for the investigations of 1923. See Roberts, 1925, pl. 20.

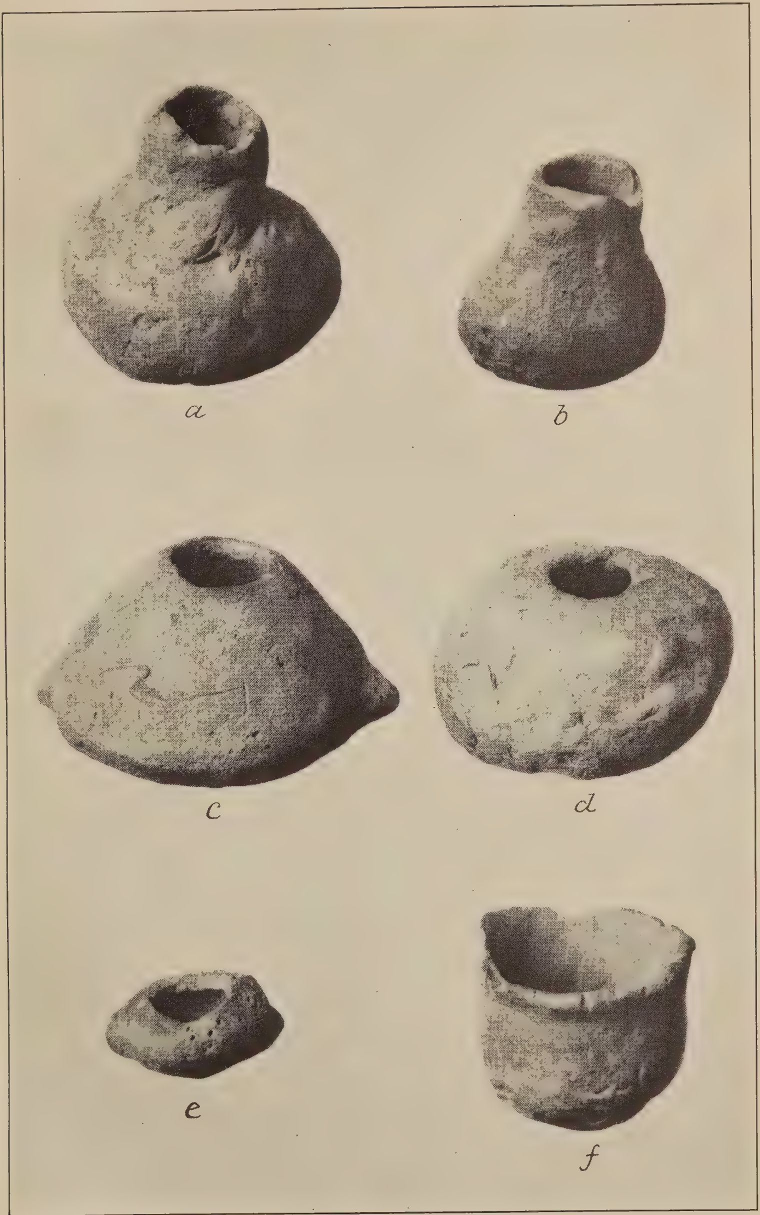


CYLINDRICAL AND ECCENTRIC-FORM VESSELS

a, Black-on-white; *b*, black-on red; *c* and *d*, undecorated.



MINIATURE POTTERY FORMS



MINIATURE VESSELS

stands 6⅝ inches (16.8 cm.) high and the diameter of the body is 4⅜ inches (11.1 cm.).

The forms of the miniature vessels are so like those of the larger containers that there is no necessity for a detailed discussion of them. The forms include bowls, jars, pitchers, and ladles, and an occasional bottlelike shape. (Pls. 34, 35.) The majority of them are rough in finish and do not give indications of the coiling or band technique. They were merely molded out of clay. The majority of those illustrated came from burials, but an occasional one was found in a house pit or in the refuse mound of the unit or village. The only factor of special interest in connection with this group is the large numbers of them found. The proportion of such objects in the Piedra sites is much higher than ordinarily is found to be the case.

DESIGNS ON THE PAINTED POTTERY

Decorations on vessels made during the Pueblo I period along the Piedra River were placed on the interior of bowls and ladles and on the exterior of the various forms of the nonculinary jars, pitchers, bird shapes, and eccentric forms. Rarely is any ornamentation found on the exterior of bowls. This is in contrast to the vessels of this class found in some sections of the San Juan in later periods, particularly Pueblo III, where the decoration was frequently extended to the exterior surface. The use of designs on pitchers, seed jars, large storage and water jars, bird forms, vases, and eccentric shapes sets this period off distinctly from the preceding—Basket Maker III—where painted ornamentation was restricted mainly to bowl interiors and occasional ladles. It was not until quite late, practically the very end of the Basket Maker cycle, that a few meager and experimental decorations were applied to pitchers and other nonculinary forms.[95] Even in the Pueblo I stage the ornamentation of such vessels was not as elaborate, on the whole, as that on bowls, and in the majority of cases the designs do not exhibit the dash and freedom from restraint which more or less marks those on the latter group of containers. As in the designs on the Basket Maker III wares, the true character of the decorations of the period is more typically illustrated by the bowls than the other forms, although a few of the latter do have characteristic ornamentation.

There is one rather striking feature to be noted in the decorations on pottery. The influence which basketry had upon the ceramic industry has already been mentioned in the discussion of the development of pottery forms. This factor is even more marked in the matter of design. The earliest of the decorations show the geometrical characteristics imposed by textiles in the weaving of their patterns.

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[95] Morris, E. H., 1927, p. 189.

This is not the most significant factor, however. What impresses the psychology of primitive man upon the student is the manner in which the designs were used. In the late Basket Maker period they are essentially textilelike in character, but in addition are of the kind found only on baskets. The potters of this period had great resources for design elements in the elaborate patterns woven in the sandals and twined bags, headbands, and other objects of the textile art, but did not use them.[96] Due to the similarity of purpose, to the fact that ceramics replaced to a considerable degree the baskets, the pottery was decorated only with the basketry designs. In the minds of the earliest potters there presumably could be no interchange of factors between groups of unrelated usage. In the following period, the one with which this paper is most concerned, Pueblo I, the ceramists began to cast about for new elements, and designs from other textile forms came into use. Perhaps this is one of the factors attributable to the Pueblo peoples. At any rate, there is the record of the old conservative practice of certain things for certain purposes giving way to a wider point of view and the adopting of new ideas.

The discussion of designs which is to follow will attempt no interpretation of the so-called symbolism of decoration. No effort will be made to discover what esoteric, mythological, or mystical factors might conceivably be concealed in the various combinations of elements. Such a treatment of prehistoric ornamentation would be so largely a matter of pure guesswork that it is not deemed advisable or essential. A study of that nature belongs to the field of speculative art, not that of practical archeology where stylistic features and general characteristics are sufficient to an understanding of period and cultural differences.

The ornamentation on the vessels is predominantly of the rectilinear geometric style, but curvilinear and realistic figures do occur. As a matter of fact, life forms are present more frequently on vessels from the Basket Maker III and early Pueblo I stages than in any of the later pre-Spanish phases with the exception of the outstanding examples of such figures found on the vessels from the Mimbres Valley in southern New Mexico. The main point of emphasis with respect to the realistic figures in the designs should be placed on the fact that from the very beginning of the manufacture of painted vessels both forms were used in the decorations, and they existed side by side, so to speak. It has previously been pointed out that one did not grow out of the other or result from it in the early development of southwestern pottery designs,[97] but this is so contrary to the general widespread belief that attention should again be called to it. Certain life or realistic forms did become conventionalized in very late periods, but this was only after many centuries of experiment and development in the field of pottery decoration.

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[96] Morris, E. H., 1927, p. 197.

[97] Roberts, F. H. H., jr., 1929, p. 122.

The main elements in the designs on the vessels from the Piedra villages, and this is also true for the period in general, consist of dots; stepped or zigzag and squiggled lines; ticked or dotted lines; solid triangular figures; dotted triangles; triangles with rectilinear, or rarely curvilinear, tips, elements of the fret decoration; circles; and checkerboarding. These comparatively simple elements were used in an almost countless number of combinations and, although the designs fall into certain definite stylistic groups, no two decorations are exactly alike.

The field for decoration on bowls, the concave inner surface, was treated in a number of ways. One group of designs consists of a single panel passing through the center bisecting the bowl. In another group the field is marked by a tripartite division usually obtained by the use of rectilinear or curvilinear spiral radii. A third form has a quadrant treatment. The latter was obtained from the first form by passing a second panel, series of lines or single line, across the field at right angles to the first figure. In both the tripartite and quadrate forms the sectors may contain additional figures. Another form or plan of decoration comprises the group of vessels with figures which are pendent from the rim but do not cross the center of the field; do not go to the bottom of the bowl. In this group are two panels placed at opposite sides, three figures occurring at fairly regular intervals, or rarely four panels. Figures of this form may be either rectilinear or curvilinear, at right angles to the rim or cutting obliquely across the field for decoration. Another arrangement consists of two or four figures placed on opposite sides at some distance below the rim. The last major group consists of an encircling band extending all the way around the sides of the bowl. The band may be just below the rim, midway down the sides of the vessel, or practically circling the bottom. There are certain variations and combinations of the several plans described and occasionally there is what might be termed an all-over decoration. one which practically covers the entire surface of the bowl.

On the jar and pitcher forms there are two zones of decoration, one around the shoulder or line of greatest diameter, and the other on the neck. The designs in general in this group consist of an encircling band made up from elements already mentioned. On an occasional form the decoration consists simply of a single figure repeated on opposite sides of the vessel. Some of the water jars have two panels placed on opposite sides of the neck. The seed-jar forms have the decoration placed on the flattened top. The field for design on these vessels is quite comparable to that of the bowls, except that it is slightly convex instead of concave. Interestingly enough, it was treated in much the same fashion as the interior of the bowls.

BLACK-ON-WHITE WARES

A number of characteristic examples of each of the several types or styles of decoration mentioned in the preceding paragraphs will be considered in some detail. A lengthy discussion or description of all of the designs represented in the collection is beyond the requirements of the present paper, but a sufficient number will be presented to show the typical forms. Because of the predominance of the black-on-white wares, they will be considered first.

The color of the pigment in this group, as previously mentioned, varies from a brownish-red to a good black, practically the whole range between these two extremes being represented. The majority tends to a brownish tinge, the result of a lack of control in the firing of the vessels.

Several of the vessels in the Piedra group exhibit a rather interesting feature in the pigment aside from that of color variation. On certain specimens there is a slight vitrification, a glazing, so to speak, in some of the lines of the decorations. This vitrification was no doubt due to some element in the material from which the paint was made. The heat of the fire in which the pots were baked melted and fused some of the mineral, producing a glasslike surface on certain portions of the decoration. In most cases this glaze has a slightly greenish tint to it. The effect was unquestionably accidental, but is of interest because of the early stage which the vessels represented. Some investigators have held that glazing in the designs was unknown before the arrival of the Spaniards. It is true that it did not come into widespread use until late in the Pueblo cycle, Period IV, but here is direct evidence that the possibility of such a feature was apparent at the very beginnings of the culture.

The decorations on many of the vessels are too indistinct to show well in photographs, and for that reason it has been deemed essential to reproduce them in the black and white drawings. The text figures err, for the sake of convenience in reproduction, in the bowl and jar top outlines, which in rare cases only approach the accurate circular form indicated. The actual designs, however, follow closely the originals. The general tendency in illustrating pottery designs is to idealize them, and as a result much of the actual Indian character is lost. Even though the temptation to improve was great, the accompanying text figures reproduce exactly the irregularities and mistakes, the crudity of line, present in the actual decorations. Strange as it may seem, it is harder to copy the irregularities than it is to make a more perfect drawing.

The group of designs consisting of a single panel or figure bisecting the field for decoration has a great many variations. The figure may be quite simple or very elaborate. One of the plainest designs falling in this group and one which is quite characteristic not only of this period but also of the late Basket Maker ornamentation is illustrated in Figure 20, *a*. As will be seen from the drawing, a zigzag figure consisting of four more or less parallel lines cuts its way across the center of the concave surface. The brushwork was rather crude and the angles are more rounding than sharp. There is no question but what the undulating or squiggled line which is so frequent in the designs of later periods originated in just such a fashion from the rectilinear form which had been imposed by the basketry technique. The pigment in the design had been applied directly to the smoothed surface of the vessel. There was no slip.

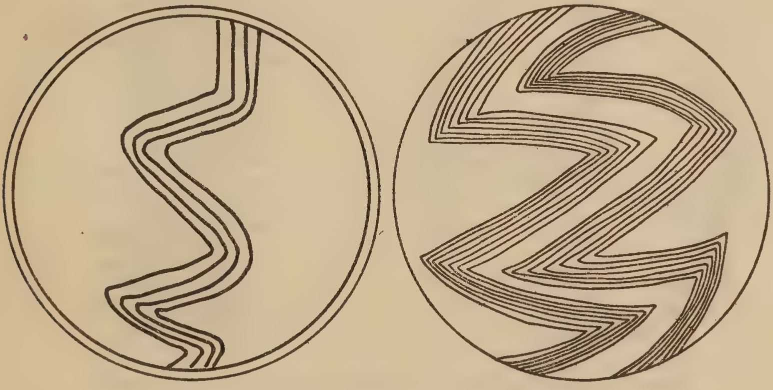

FIGURE 20.—Zigzag line elements in bisecting panel designs

The color of the pigment is a decided brown. The whole aspect of the vessel is such that under ordinary circumstances it would readily be taken for a Basket Maker III bowl. Another simple variation of the use of zigzag lines in a panel figure is illustrated in Plate 25, *a*.

The second bowl decoration on Figure 20, *b*, does not strictly belong in the group under consideration because it has two figures instead of one. Since it represents an amplification and elaboration of the single zigzag element, it is included at this point for comparative purposes. Here there are two zigzag elements, each composed of seven parallel stepped lines, cutting across the center of the bowl and almost filling the field for decoration. This design represents a later development and is one which on the whole may be considered quite characteristic of the early Pueblo period. The lines in the decoration show better drawing, a surer touch than those of the preceding example. In addition the pigment is a better black and the bowl had a thin slip. The vessel was materially blackened during the burning of the house in which it was found and at the present time the lines in the design are rather hard to trace, although there is no doubt concerning the form of the ornamentation. Slight variations of this type of design are frequently encountered on vessels of this and the following period. The form is even found on an occasional red-ware bowl.

Two very crude attempts at decoration are illustrated in the designs Figure 21, *a*, *b*. Both are examples of the division of the field for decoration into halves by a single figure or panel cutting across the center of the bowl. The first, *a*, has an additional treatment in that the extra figures were placed on the opposite walls of the divided interior. The bisecting element is simple in the extreme, consisting as it does of a single broad line with a circle at the center or bottom of the bowl. This circle at the bottom of the bowl is a feature which is one of the characteristic elements of the Basket Maker III designs [98] and one which unquestionably is a survival from basket ornamentation. Both the zigzag line and circle are to be found on the baskets from Basket Maker sites.[99] What significance, if any, the small circle may have had is not known, but it has frequently been suggested that it may have symbolized the same thing as the sipapu in the kiva—namely, the mythical place of emergence of the ancestral peoples.

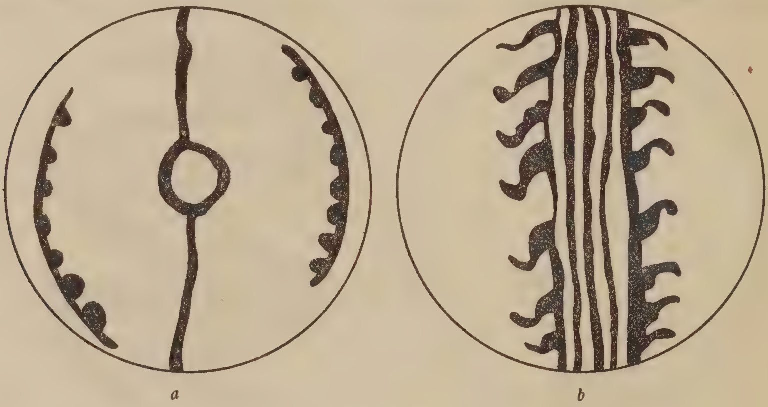

FIGURE 21.—Simple forms of the bisecting panel plan of decoration

The two figures on the walls of the bowl are simple broad lines with a series of dots along the lower edge of each. On one of the lines there are seven dots while the other has eight. It does not seem that any special significance can be attached to the numbers.

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[98] Morris, E. H., 1927, p. 193; Roberts, F. H. H., jr., 1929, p. 119.

[99] Guernsey, S. J., and Kidder, A. V., 1921, pl. 24; Morris, E. H., 1927, fig. 42, *a*; 43, *a*, *b*, *c*, *d*.

The effect in each case is the same regardless of the difference in number. The pigment of both the central and side figures is a fairly good black with a slight suggestion of a glaze. The surface of the bowl did not have a slip.

The second design (fig. 21, *b*) is a single panel composed of five approximately parallel lines passing through the center of the bowl. The outer lines have additional figures in the form of the slightly leaf-like elements. The latter were probably not intended to represent leaves, however, but are more likely what resulted when the potter tried to paint a series of triangular figures with tips, the so-called bird symbols, of the form so frequently found on the vessels of this period. The specimen itself gives the impression that too hasty or especially unskilled brushwork was responsible for the form which the elements took. The pigment in this decoration is a rather faded black. Before it was applied to the interior of the bowl the bowl was given a coating of "liquid" clay—a slip. Two very similar designs are illustrated in Plate 25. One of them, *c*, is quite well done and shows a fair amount of skill with the brush. The other, *f*, has practically the same characteristics illustrated in the example depicted in the drawing. There was an amplification in the design illustrated in the photograph, however, in that it has the border lines, with the stepped treatment, around the wall just below the rim. The bisecting panel is quite comparable to the one just described—in fact, suggests that it might have been made by the same potter. Both of the latter bowls (pl. 25) were slipped. One especially well illustrates the thick and thin feature described in the discussion of the slip in general. It is *c* of Plate 25.

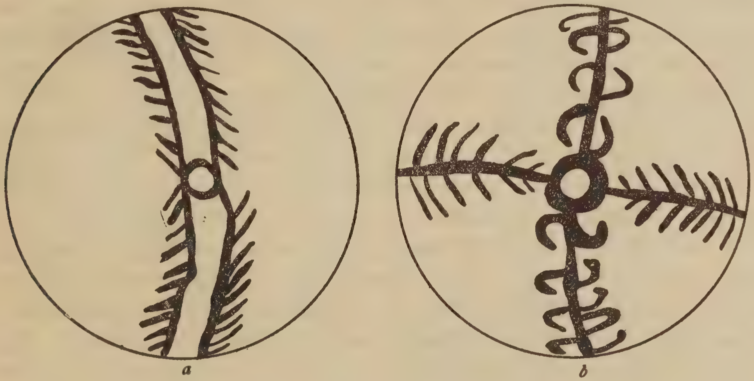

FIGURE 22.—Bisecting panel and quartered designs

Still additional examples of the same crude style of painting are illustrated in Figure 22. The figure in *a* may be considered either as a single panel cutting across the center of the field for decoration or as two similar panels meeting a circle at the center or bottom of the bowl. The design is one which is so characteristic of the Basket Maker III period that it might have come from such a site rather than a Pueblo I house along the Piedra. A closely comparable decoration is on a bowl which came from a late Basket Maker site in the Chaco Canyon.[1] The main difference between the two is in the series of zigzag dots which fill the panels in the Chaco specimen. The pigment of the design in the present example (fig. 22, *a*) is a fairly good black and the bowl was treated with a slip before the decoration was painted on it.

The second design (fig. 22, *b*) rightfully belongs in the group of quadrate decorations but has been included at this point because of its general similarity in technique to the forms just described. As will be noted, it also has the small central circle from which the other figures radiate to the rim. What the latter may have been intended to represent it is not possible to determine. They definitely show a departure from strict basketry forms of design, however. The delineation is far from good. Most of the brushwork in this group (figs. 21, 22; pl. 25, *b*, *f*) suggests that the artist was using too thin a pigment and had too much paint on the brush when the painting was done. They are in distinct contrast to some of the other decorations which show a careful and quite precise handling of both the brush and the pigment. To a certain extent the crudity of these specimens may be attributed to the possibility that the potter was a beginner and had not yet mastered the technique of decoration. The pigment in the design Figure 22, *b*, is thin and grayish black in tone. This characteristic may be due in large measure to the fact that no slip was placed on the vessel and the pigment was so thin that a part of it sank into the paste of the vessel. The latter feature is frequently found on vessels of the Pueblo I period. It is so marked in some sections that it has been considered one of the characteristics of the period.

Two examples of the use of a more complicated device in the form of the bisecting panel are illustrated in Figure 23. Both illustrate characteristics which are typical of the normal phase of the Pueblo I pottery designs. The main elements are parallel stepped or zigzag lines, dots, bird figures, and in one the use of the squiggled or wriggly lines. The central figure in *a* might well be considered to consist of two panels pendent from the rim of the bowl and extending down the sides to the center. Both are alike in that they are made up of a series of nine parallel lines, are stepped, and are bordered along one side and the lower end by rows of dots. The band of tipped triangular figures, of the so-called bird-symbol form, around the walls of the bowl just below the rim are decidedly characteristic. They constitute one of the chief elements in the designs of the developed phase of the Pueblo I period. Rarely is one found on a late Basket Maker vessel, and although they are of quite frequent occurrence in later stages they can not be considered as typical of those horizons as they are of the early part of the Pueblo era. The particular bowl on which this design was painted was found in one of the burned houses and as a result of the terrific heat to which it had been subjected in the destruction of the building the pigment was burned to a good red color. Because of this the bowl is quite striking in its appearance, but the pigment probably was originally a variation of black. A fairly good slip had been applied to the inner surface of the bowl. The secondary firing was sufficient to give a pinkish cast to the slip which adds to the attractiveness of the specimen.

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[1] Roberts, F. H. H., jr., 1929, pl. 16, a.

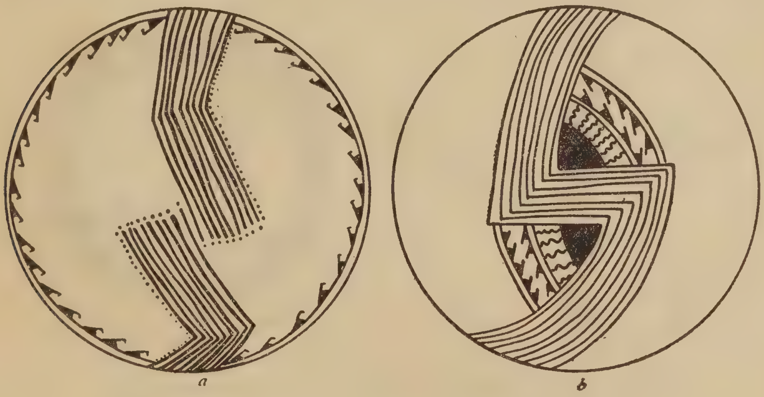

FIGURE 23.—Elaborate variations of bisecting panel designs

One of the most pleasing and carefully executed designs found is that of Figure 23, *b;* Plate 26, *f.* The conception and technique exhibited in this decoration are above the average for the group of specimens in the collection. The central element in the figure is a series of nine stepped parallel lines cutting across the center of the field for decoration. The effect was materially heightened by the addition of the solid triangular figures which were obtained by the filling in of the corners at the angles formed by the stepped lines, by framing the solid elements with the rows of squiggled lines, and by the outer bands of opposed bird or small triangular figures. The filled-in corners, wriggly lines, and so-called bird symbols predominate in the designs which mark the end of Pueblo I and the beginning of the Pueblo II period in the Chaco Canyon.

The present example is so typical of that group that it might well have come from one of the sites in the Pueblo Bonito district. The appearance of this plan of decoration at such an early stage in the beginning period of the Pueblo cultures is of considerable interest to the student of the Chaco cultures. It certainly represents one of the earliest forms of what was to become a very popular style of pottery ornamentation. The brushwork in the design is good and the pigment black. It has been somewhat obscured by an earth stain which also discolored the surfaces of the vessel. Various acids were used in an effort to remove this stain and an attempt was made to burn it off but without success. Enough was removed, however, to make evident the fact that a good slip had been applied to the bowl prior to the painting of the decoration.

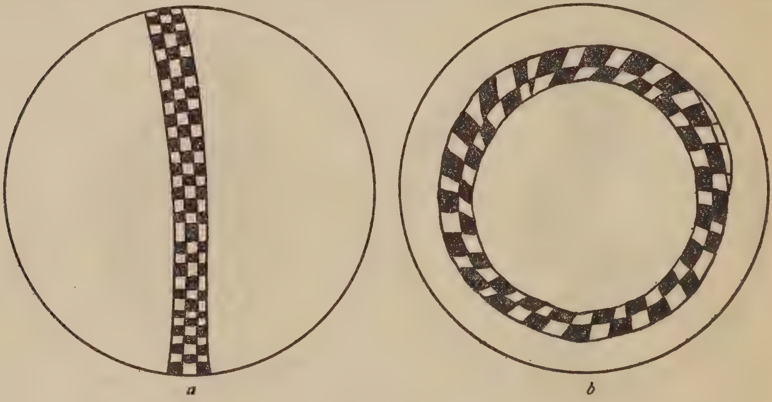

FIGURE 24.—Checkerboard element in panel and band decoration

Only a few examples of the use of the checkerboard element in decoration were found and it does not seem to have come into widespread use until the following period. One bowl with a checker design falls into the general group of the bisected field in that its sole ornamentation consists of a single panel of the checkerboard form which cuts across the center of the concave surface. (Fig. 24, *a*.) The effect produced is quite pleasing, even though the design is a very simple one. The pigment is a faint black and gives the appearance of having been washed out, which possibly is the result of too thin a mixture on the part of the painter. The bowl was slipped with a coating of the "liquid" clay, but is quite discolored from some substance which was in the soil where it was buried.

A variation of the checkerboard form of decoration is illustrated in Figure 24, *b*, and Plate 29, *b*. This design properly belongs in the group of band decorations, but since it is the sole example of the use of this particular element in such a fashion it has been placed with the other form of simple checkerboard decoration. The design is simple but interesting because it shows a mistake on the part of the potter. At one side the upper line which was to have been a part of the framework for the solid portions was carried too far up on the side of the bowl. The potter seems to have thought that it would not do to have the rectangular figures so much larger than the others, so drew a second line and filled in the rectangles only to that point, allowing the other lines to remain. The pigment in this decoration is somewhat faded but black. The vessel does not have a slip.

The tripartite form of decoration does not seem to have been particularly popular along the Piedra, as only a few examples of it have been found. Why this form should not have been more widely used during the early part of the period in this district is not clear, as it was quite prevalent during the Basket Maker III stage. The Piedra examples show both rectilinear and curvilinear forms. (Fig. 25, *a;* pl. 27, *a*.) The rectilinear decoration illustrated consists of three radii extending from a circle at the bottom of the bowl to its rim. The radii are plain, broad, stepped lines. The curvilinear design (pl. 27, *a*) has heavy curved lines bordered by rows of dots. The radii distinctly give the impression of motion and may possibly have been intended to represent some such thing. The pigment is a fairly good black, but it loses in its effectiveness because the vessel has no slip and the color of the paste is distinctly gray in tone.

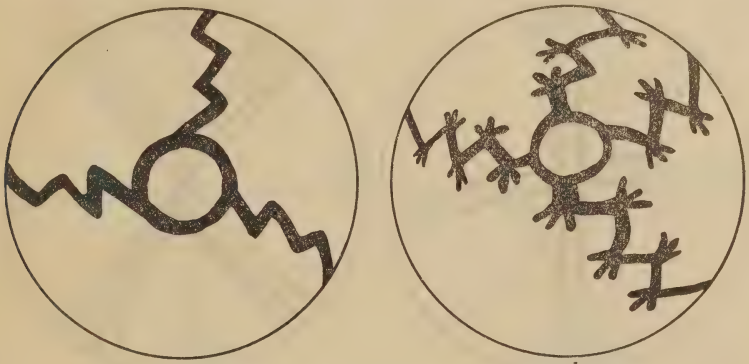

FIGURE 25.—Tripartite and quadrate designs

The second design (fig. 25, *b*) is of the quadrate form. The radii extending out from the bottom circle are also of the zigzag variety, but have, in addition, curious bird-track figures at the points of the angles. Except for the fact that there is a circle in the bottom of the bowl, or the center of the decoration, this design is quite similar to those Morris found west of the La Plata.[2] The painter miscalculated the center of the field for decoration considerably in the present example and the figures are not well spaced. The latter show considerable irregularity in the matter of the angle elements. On two of the radii there are five, one has four, and the other three. One reason for this variation may be found in the fact that the circle was so far off center that it was not possible to draw the lines sufficiently long to provide an adequate number of angles. The pigment of this decoration is quite red in color, indicating that the vessel was considerably overfired. The slip in this instance is much better than that found on most of the bowls and is a rather clear white.

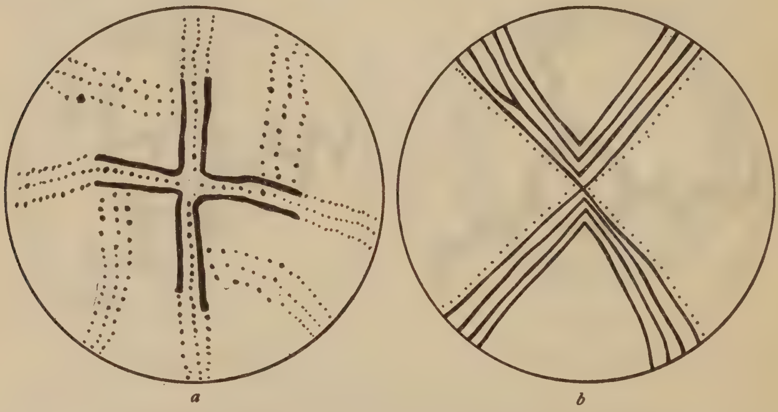

FIGURE 26.—Simple forms of the quadrate plan of decoration

The quadrate plan of decoration is well represented in the bowl designs. One rather curious example was made up largely of dots, although there is a heavy cross figure in the bottom of the bowl formed by four heavy lines. (Fig. 26, *a*.) The latter take the place of the dots in that portion of the design. The central row of dots is continued to the bottom of the bowl, however. The combination line-and-dot cross was still further embellished by four figures composed of three rows of dots which for all practical purposes may be considered as parallel. The latter figures extend from about the center of the arms to the rim of the bowl. The design as a whole is not particularly pleasing. No slip was applied to the vessel prior to the painting of the decoration, and as a result much of the pigment ran into the paste and the dots became quite irregular in form. The pigment is a grayish black in tone. This is probably the result, as previously suggested in connection with another design, of the thin paint soaking into the surface of the bowl when it was painted. Another example of the use of dots in a quadrate design is illustrated in Plate 25, *e*, where two quarters were filled with dots and two left undecorated.

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[2] Morris, E. H., 1919 b, pl. 64, b, d.

The quadrate form illustrated in Figure 26, *b*, is of the more characteristic type. The bowl was quartered by two lines crossing near the center at the bottom. Two quadrants were then decorated with triangular figures pendent from the rim. The latter figures are simple in the extreme in that they consist of a series of three more or less parallel lines meeting three similar lines near the center of the decoration. The other two opposed quarters of the bowl are plain except for the single row of dots which parallels the main quartering lines of the decoration. This bowl was considerably overfired, as is shown by the marked brown color of the pigment. A very thin slip was applied to its surfaces before the decoration was painted.

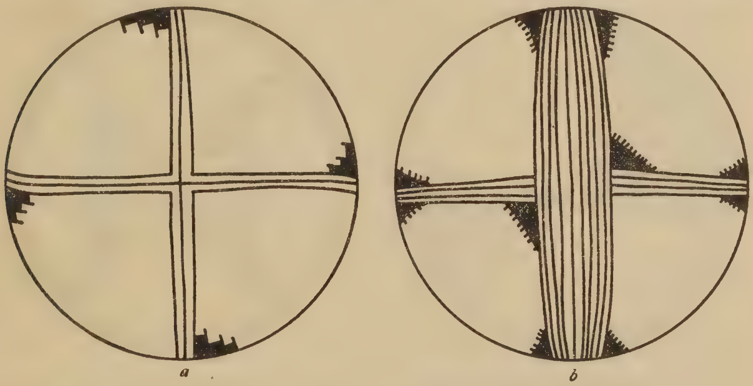

FIGURE 27.—Quartered designs from bowl interiors

Two simple yet typical forms of the quartered bowl treatment are illustrated in Figure 27. They are of a type which in all respects may be considered characteristic of the Pueblo I period. The first one, *a*, is plain but nevertheless effective. Here, as in the specimen described in the preceding paragraph, the field for decoration was quartered by single lines crossing at right angles at the center of the circle or bowl. In each of the quarters was placed a single pendent triangular figure consisting of two lines drawn parallel to the main quartering lines, extending down from the rim to meet and form an approximate right angle near the center of the design. At the rim end of one of these lines, in each quadrant, a solid stepped or terraced figure was placed. Projecting from each step of the terrace is a short line. In some of the designs of a similar form found elsewhere the projecting tips are embellished by small ticks or dots placed along one edge. This is especially well illustrated by the decoration on a bowl which Mr. Morris found on the Navaho Reservation.[3] The latter vessel is reported from the Basket Maker III horizon, although it might well be in the Pueblo I group from the Piedra district. This form of design, considered as a whole, might be construed as a variant of the swastika. The pigment on the fragments of the bowl from which this design was restored was brownish black in color. There had been no slip on the vessel.

A somewhat more elaborate example is depicted in Figure 27, *b*. This design if carried to the last analysis is not truly a quartered decoration in the sense that *a* is, but a halved form in which the two sections were still further divided by panels extending from the rim to the main bisecting panel. This central and main figure in the design consists of a series of ten parallel lines. At the rim ends of the outside ones are triangular figures with dotted edges. The halves of the bowl formed by this panel are divided by two figures of four parallel lines. The latter extend from the rim to the center. At the outer or rim ends of the border lines in these panels there are also the dotted triangular elements. At the inner ends, however, the solid element occurs only on one side, although a balance is maintained because the single figures were placed on opposite sides. The pigment on this vessel has a marked brownish tone. No slip was applied before the painting and firing of the bowl.

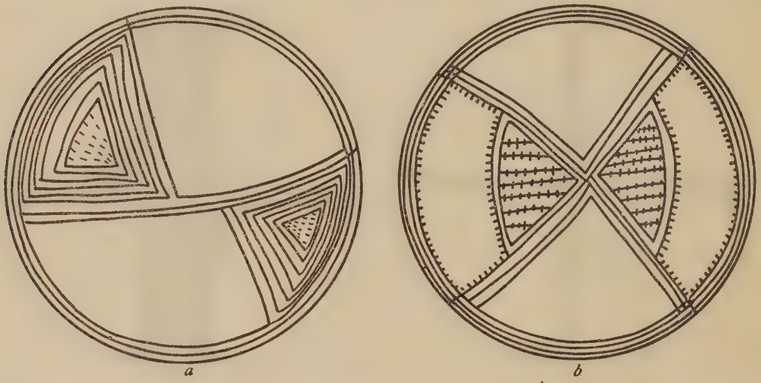

FIGURE 28.—Parallel and ticked line elements in quadrate forms of decoration

The next design to be considered (fig. 28, *a*) is one which might be interpreted in two ways. In one sense it is simply a variation of the plan in which the center of the bowl is bisected by a panel device elaborated at the rim ends, but in another it may be considered a variant of the quadrate type. There are two undecorated and two figured quadrants. The decoration seems to have been developed by first painting the concentric lines around the periphery just below the rim. Then a line was drawn across the proximate center of the bowl. It is possible, of course, that the dividing line was the first drawn, but the decoration itself suggests that such was not the case because the diametrical one appears to overlie the two concentric ones where it crosses them near the edge of the bowl. The fact that the central one stops at the inner circle on the opposite side also suggests that the latter was drawn first. The next step, apparently, was to mark off the quadrants. On the upper half of the design, as illustrated in the text figure, this was accomplished by the painting of two lines which met near the center of the bowl, thus forming a pendent triangle. The interior of this figure was left undecorated. The corresponding space in the other half of the upper division was then filled with a series of concentric triangles, five in number, which framed a smaller figure of similar outline. The latter was filled with a series of short lines or ticks to complete the design. Whether the painter started at the center and worked out, or vice versa, can not be determined, although certain features suggest that the outside triangle was the first drawn. It would have been much easier to have proceeded in that fashion, but the easiest way frequently is not that of the lower cultures. The other half of the design shows a somewhat different treatment. Whether this was accidental or intentional is a moot question, but in all likelihood it was fortuitous. The Indian painter proceeded, until recent suggestions by the white man changed the order of things, not from a predrawn plan but as the fancy directed and from a pattern carried in the mind. As a consequence mistakes were frequent. In the lower section the secondary line was drawn from the inner circle on one side to the outer framing line of the series of concentric triangles on the other, forming one side of the triangle as it did so. The section was divided by the drawing of a line from the inner circle to the diametrical one, which it joined at approximately a right angle. In general the two quadrants with the concentric triangles are alike, but close examination shows a difference in the line treatment. The pigment in this decoration is of the faded black variety and the bowl has a thin slip.

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[3] Morris, E. H., 1927, fig. 31, b.

A characteristic use of the ticked line element is depicted in the design, Figure 28, *b;* Plate 26, *e*. This decoration is in general quite like some of those already discussed. The bowl was quartered by single lines intersecting at approximately a right angle near the center of the decorative field. Chevronlike parallel lines were then placed in each quarter. Two of the opposing quadrants were left undecorated while the other two were embellished by the figures filled with parallel ticked lines. The latter triangular elements were framed by single parallel lines at their base sides and the remaining section of the quadrant thus formed was completed by the use of the ticks along the inside edges of the bordering lines. This is another design which is characteristically Pueblo I in its nature. The pigment tends to brownish-black and the slip has a slightly yellow cast to it.

The next group of designs to be considered is that of the pendent figures. One of the simplest forms consists of two figures placed on opposite sides of the bowl and cutting across the field obliquely. (Fig. 29, *a;* pl. 26, *c.*) The example shown in the text figure is simple yet makes a pleasing ornamentation. The panels are similar but not identical. Each consists of a series of six parallel lines. The outer two or bordering lines are supplemented by rows of the conventional bird form or tipped triangular figures. It is in this feature of the design that the greatest difference between the panels is to be observed. That at the left of the decoration, as illustrated in the figure, has three and four of the solid triangular elements while that on the right has four and five. The pigment is of the black variety which gives evidence of having been partially absorbed by the nonslipped surface on which it was placed.

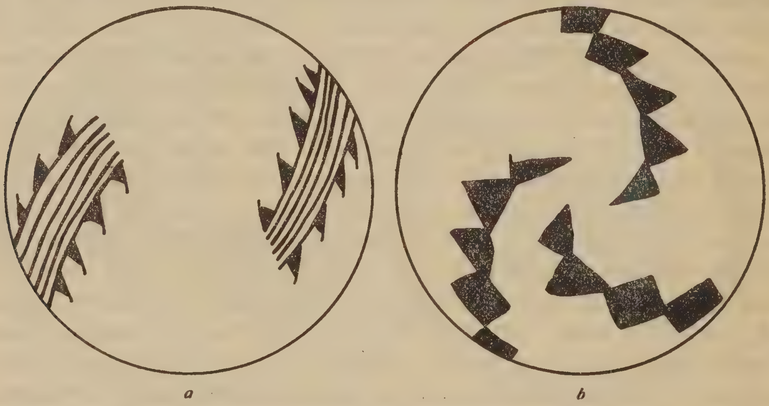

FIGURE 29.—Pendent panels of the oblique and spiral forms

An example of the triple pendent figure plan of the oblique style is illustrated in the second design in Figure 29. The elements in this decoration are simple in the extreme, being merely solid rectangular or triangular figures placed in a stepped series, corner to corner. This decoration unquestionably represents a survival of an old basketry design.[4] The form has been simplified by omitting the framing lines of the basket original but shows the influence of the latter style of decoration. The pigment used in painting this design was very thin and at the present time is almost undiscernible. It verges on a gray-black hue, a feature which is no doubt heightened by the fact that the vessel paste shows through the paint. No slip was placed on this bowl at the time when it was made.

The perpendicular form of pendent panel is well illustrated in the next example of the style. (Fig. 30, *a;* pl. 26, *d.*) Here two similar figures composed of opposing dotted triangles framed by two concentric rectangles were placed on opposite sides of the bowl. This specimen and its decoration is very suggestive of the Chaco Canyon ceramics. The dotted triangle with bordering parallel lines is one of the chief elements in the designs on the pottery of the fully developed early Pueblo periods. The black of the paint in this decoration is quite good. The vessel has a slip which is somewhat thicker than that on a majority of the bowls. It has a slight orange cast to it which gives the bowl a pleasing appearance. Whether this was the original color or resulted from a secondary firing when the house in which it was found burned down is not known. The fact that the decoration does not show a marked overfiring would suggest that the slip was originally the same as it is now.

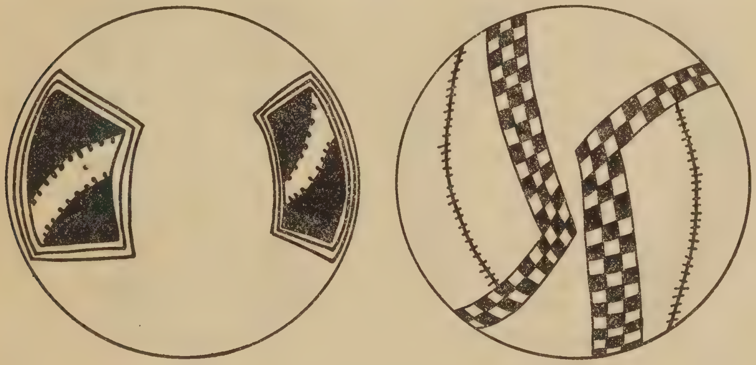
a *b*

FIGURE 30.—Pendent panels, balanced decorations

The chevronlike panels of checkerboarding placed at opposite sides of the decorative field on the bowl in Figure 30, *b*, illustrate how effectively such a simple element was used. Both panels are alike but show slight variations. The use of the ticked lines to embellish the open portion of the panel is one which is frequently found in the early decorations. When the pleasing results which could be obtained with the checkerboard element were so apparent it seems strange that greater use was not made of such designs. The potters of Pueblo II and succeeding periods very often availed themselves of its possibilities, but in this, its developmental stage, only sporadic examples are found. The pigment in the present decoration is a very thin black. Furthermore, the surface of the bowl has been so stained by the earth in which it was buried that it is difficult to trace the design. A very thin slip seems to have been applied to the bowl. The whole character of the vessel is so similar to that of the bowl with the single bisecting panel of checkerwork (fig. 24, *a*) that it suggests the hand of the same potter.

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[4] Morris, E. H., 1927, fig. 42, a.

Two pendent chevron panels similar in their general outlines to those of the checkerboard form just described, but quite different in their component characteristics, are to be observed in the design illustrated in Figure 31, *a*. The sole element in this decoration is the ticked line. A number of the latter were combined in parallel, concentric order in such a way as to form the panels. The latter are similar but not identical in their composition. That at the left of the drawing in the text figure contains seven lines while the other has but six. The latter also shows an overlapping at the corners where the vertical and oblique lines meet. This failure to make perfect corners is a feature which has been considered one of the characteristics of the designs of the period.[5] The pigment in the decoration is a thin black, and even though the bowl had a slip there was some tendency for the paint to sink into the surface. It is quite possible that the potter not only made too thin a mixture when preparing the paint, but in addition sufficient time was not allowed for the complete drying of the slip before the decoration

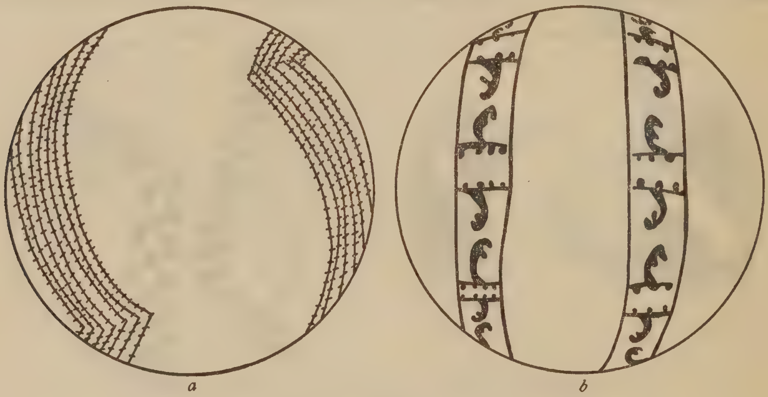
a *b*

FIGURE 31.—Double panel designs on bowls

was applied. Some such explanation is necessary to account for the large number of vessels exhibiting this feature. Another form of the ticked line design plan is illustrated in Plate 28, *a*.

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[5] Guthe, C. E., 1925, p. 8.

Two panels cutting across the field of decoration from rim to rim, parallel to the diameter of the bowl, rarely occur in the Piedra designs. One example of such a pattern is all that has been observed in the collections from the district. The design illustrated in Figure 31, *b*, is unique in the group. The panels are similar and consist of two main framing lines inclosing a series of curvilinear key figures which rest on dotted crossbars. The bowl as a whole presents a different aspect from the majority of the Piedra forms and suggests quite strongly that it may have come from another district; possibly it represents a trade piece. The vessel itself is quite similar to those of the Pueblo I period in the Kayenta district to the west. The design, however, is different from the usual forms in that region and it is possible that the vessel simply represents an aberrant form. An occasional potsherd is picked up which shows clearly that it came from some Kayenta Pueblo I community and that there was some intercourse between the Piedra and that district. The Kayenta district pottery of this period, which was the first to be recognized as coming from an early Pueblo horizon and which was then called slab house, later pre-Pueblo, and now Pueblo I, can not be mistaken because its characteristics are so typical.[6] The pigment of the decoration here depicted is a thin black and evidences the feature of having penetrated, to a certain extent, the very thin slip on the bowl.

Several variations and modifications of the pendent panel pattern are to be observed on some of the bowls illustrated in the photographs. One which may debatably be included in the group has parallel and ticked line elements forming the decoration. (Pl. 25, *d*.) If the oblique parallel lines had been continued to the rim at each side of the bowl instead of being connected with those on the opposite side the design would be quite like the general outlines of some of those already discussed. As it is, however, the treatment resulted in what might be termed an openwork panel across the center of the field of decoration and an added embellishment of the ticked lines was placed in opposite sectors. The general feeling, so to speak, of this design is quite in keeping with that of the other parallel line and dotted or ticked line decorations of the group. The pigment is a fairly good black and there are no indications on the bowl that a slip was applied in the finishing process.

Still another variation, or in this case an amplification, of the pendent panel form is found in the design on the bowl illustrated in Plate 28, *b*. This decoration has two panels placed at opposite sides of the bowl which are composed of two rows of opposed solid triangles. The painter in this case was very consistent in that there are eight of the triangles in each row. The two panels failed to satisfy, however, and additional ones were drawn connecting them. The secondary ones were smaller and more irregular. At one side there are eight open triangles pendent from a line connecting the two main figures in the pattern while at the other side of the bowl there are but four. In the center, at the bottom, there is a small circle of the form so frequently found on the Basket Maker III containers. The pigment in this decoration shows clearly the glazing feature previously discussed. There is no slip on the bowl.

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[6] Kidder, A. V., and Guernsey, S. J., 1919, pp. 152–153.

The group of decorations in which separate figures were placed on the sides of the bowl, some distance below the rim, is represented by a number of specimens, but only by a small variety of elements. Circles with radiating T-shaped spokes, cogwheel forms, constitute the main motif. In the examples illustrated (pl. 27, *c*, *d*, *e*) one of the bowls has but two figures, placed on opposite sides, while the others have four. There is a certain amount of variation to be seen in the actual symbols. Those on the bowl with the two figures consist of seven concentric circles, one of the four figured designs has four concentric circles, and the other has only the single ones. All three have the small circle in the bottom of the bowl, which is a survival from the Basket Maker designs. The pigment is a fairly good black. One, *e*, shows some traces of the accidental glaze. None of these bowls has a slip. The circle figures here illustrated are not peculiar to the small group which lived on Stollsteimer Mesa because another bowl bearing similar symbols, three placed in a line across the center of the field for decoration, consisting of two concentric circles was found at a site on the San Juan River several miles below the town of Rosa during the 1923 investigations.[7]

Only two examples of the rectilinear form of decoration in which similar elements were placed on opposite sides of the bowl a short distance below the rim were found. One of the designs (fig. 32, *a*) has four figures consisting of concentric quadrangular elements. They are not identical but agree in that there are five of the concentric elements in each, and in the three rakelike symbols projecting from the tops and ends. The execution was such, however, that there is considerable individual variation. The main figure at the bottom of the design (fig. 32, *a*) also varies in that the outside element has five sides instead of four. The figures themselves are quite reminiscent of some of the designs found on occasional late Basket Maker pieces and are very textile-like in their nature. This particular bowl could readily pass for a Basket Maker III vessel. The surface has the rough pebbled quality characteristic of that period, there is no slip, and the pigment in the decoration is quite brown in tone, although very faint.

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[7] Roberts, F. H. H., jr., 1925, pl. 22, upper.

The second example (pl. 27, *b*) has four similar figures composed of parallel stepped lines placed in such positions as to suggest a variant form of the swastika design. This decoration, like that of Plate 27, *a*, gives an impression of motion. Characteristic features of the bowl are so typical of the Basket Maker III group that under ordinary circumstances it would be placed in that period. The pigment in the design has a brownish tone and the bowl was not given a slip. The roughened quality of the surface, due to projecting particles of the tempering material, is plainly to be seen in the photograph. The single hooklike handle exhibited by this specimen is rare in the collections from the district. Although a portion of the rim of the bowl is missing on the opposite side it is quite evident that there never was more than one handle.

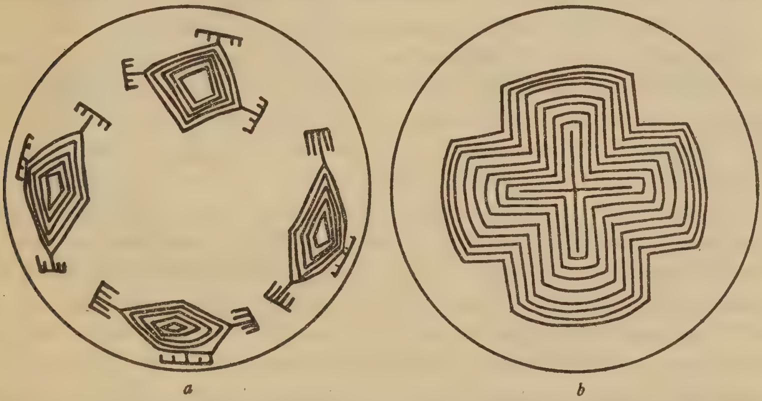

FIGURE 32.—Opposing figure design and single symbol decoration

Coming under the general head of the decorative plan of figures placed on opposite sides of the interior of bowls are the two examples containing life forms. (Pl. 30, *c*, *d*.) One of the designs has but two symbols, a quadruped, possibly intended to represent the deer, and an outlined cross. The other has four figures, two of them life forms and two geometric. The life forms may have been intended as representations of human beings. Each has a peculiar whorl at each side of the head (pl. 30, *d*) which suggests the hairdress of the Hopi maidens. The geometric forms are simply pendent ticked triangles. The outlined cross used in the other design is a symbol of some significance and is considered at some length in connection with the decoration discussed in the following paragraph. The pigment on the bowl with the animal figure is a gray black and that on the other a fairly good black with occasional greenish spots of glaze. The first, *c*, has a slip but the second one, *d*, does not.

The use of a single large figure in the bottom of a bowl is well illustrated by the design in Figure 32, *b*. The component parts are decidedly simple yet the finished symbol is rather intricate. The entire plan of decoration is a single central cross outlined by a series of eight concentric parallel lined figures. This is also a good example of the use of a typical sandal pattern on pottery. Variations of the same sort of decoration were found in the bottoms of two bowls of the Basket Maker III phase by Mr. Morris, who observed that they were the only examples he had seen in the wares of the period where use had been made of sandal symbols on pottery.[8] The Piedra bowl is characteristically of the Pueblo I type, however, as the pigment is a fairly good black and the surface has a spotty slip of the kind typical of the ceramic phase.

The next group of designs to be considered is that of the band decorations. They occur occasionally on bowls of the preceding period but are not as common as in the decorations of Pueblo I. The simplest forms consist of a series of parallel lines running around the walls of the bowl just below the rim. An example of this form which has five lines is shown in Plate 29, *c*. A slight amplification of the latter has four triangular figures composed of sets of three parallel ticked lines placed on opposite sides of the bowl and resting upon the uppermost of the banding lines. (Pl. 29, *e*.) A still further form of band in which parallel lines are used with an additional embellishment is shown in Plate 29, *f*. In this case the encircling lines are augmented by pendent figures of the so-called bird-symbol form. The bowls cited in all of these examples bear a slip and the designs are a fairly good black.

A single broad line around the walls of a bowl and a series of T-shaped symbols rising from it makes the band design shown in Plate 27, *f*. The character of this decoration as a whole is very suggestive of the smaller circles with similar radii illustrated in the same plate. The pigment in the design is a gray black and there are occasional greenish spots of thin glaze on it. The bowl did not have a slip.

The use of dots in a band form of decoration is well illustrated by the designs of Figure 33. The first, *a*, has the dots placed in three more or less parallel rows which zigzag their way around the walls of the bowl to form an eight-pointed or petaled star or flower-like figure. A small circle at the bottom of the bowl or in the center of the design completes the pattern. This particular design has faded to a marked degree and in places the dots are scarcely visible. The pigment has a tendency to a brownish tone and the vessel bears a chalky-white slip.

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[8] Morris, E. H., 1927, p. 173, e, f; p. 197.

The second, consisting of a band of dots framed by encircling lines (fig. 33, *b*), seems to be rather characteristic of the period. The design in the drawing was restored from fragments of a bowl found in one of the refuse mounds. A very similar decoration, however, is to be noted on the bowl in Plate 29, *d*. The latter has two rings of dots instead of one and three sets of framing lines above and below the band of dots. Mr. Morris pictures one which is quite like the latter in his paper on the work west of the La Plata.[9] Many potsherds picked up in the neighborhood of ruins of this period show traces of this style of design. The bowl pictured in Plate 29, *d*, shows distinctly the rather thin slip which was wiped over its surface. The pigment of the design is good in places and so thin in others that it has a grayish black cast.

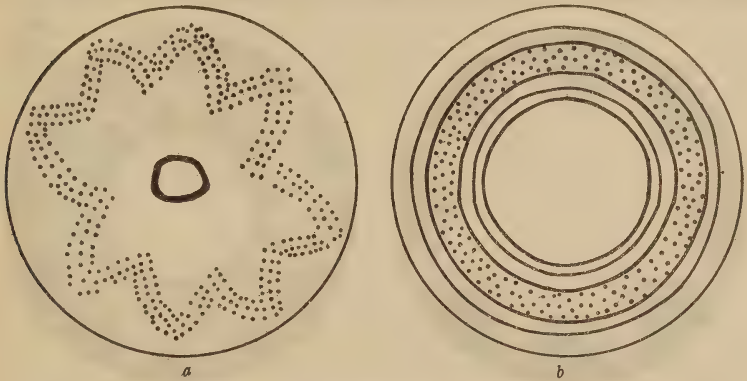

FIGURE 33.—Dot elements in band designs

Pendent triangles are usually found in fairly large numbers in the group of band designs. One very simple example is illustrated by the bowl Plate 29, *a*. Here there are three lines around the walls of the bowl well down on the sides. Below the rings is a band of solid triangles. An example of the use of triangles pendent from the rim is shown in Figure 34, *a*. This design also has the rather common feature of the parallel framing or bordering lines below the triangles. The simplicity of this decoration is in considerable contrast to the second one in the same figure, *b*. The latter has a second row of triangles, points upward, around the bottom of the bowl. The same set of parallel framing lines serve for both sets of triangles and form an emphasizing element of the design as a whole. A cruder form of the latter style in which there are fewer solid triangular elements and but one bordering line is illustrated in Plate 28, *f*. Forms of both *a* and *b*, Figure 34, are frequently found on pottery of the early Pueblo periods. Numerous examples of both have been observed on vessels from the Chaco Canyon and Morris illustrates variants of both from the La Plata district and the Navaho Reservation.[10] Pigments, as well as the surface treatment, vary on the different examples. The design in Figure 34, *a*, is a decided brown in color and the vessel has a thin slip. The pigment of Plate 29, *a*, is a good black and the spotty slip is quite apparent in the photograph. That of Plate 28, *f*, is a faint black and there is no slip on the bowl.

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[9] Morris, E. H., 1919 b, pl. 65, b.

A form of band decoration which is more nearly like those of the late phases of the Pueblo I period is illustrated in Plate 28, *d*.

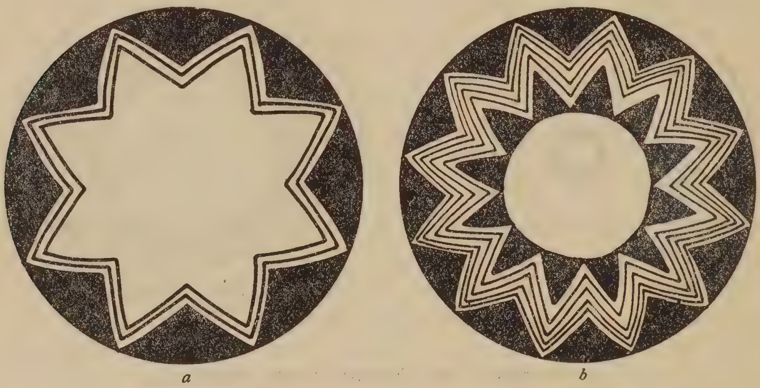

FIGURE 34.—Triangle and parallel line elements in band designs

This design has four stepped figures placed at quite regular intervals around the sides of the bowl. These figures are bordered by a series of five parallel lines which pass completely around the bowl. The pigment tends to a brownish black and the bowl has a very thin slip.

The band design Plate 28, *e*, is unique as far as examples from the Piedra are concerned and is difficult to classify. The three panels which compose it are not alike, although similar elements were used in them. The ticked rectangular figures appear as the main element in each. In one of the panels they are separated by two vertical lines and in another by but one. The third, and presumably the main, panel does not have the vertical lines. Instead it has the three rows of dots inclosed in a rectangle. The paint is a gray black and the vessel does not have a slip.

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[10] Morris, E. H., 1919 b, pl. 64, a; 1927, p. 174, a.

There are two forms of the all-over design illustrated, one a bowl (pl. 30, *a*) and the other a ladle (pl. 30, *b*). The bowl decoration is composed entirely of groups of parallel lines. Just how they met at the center can not be determined because the surface of the bowl has been so abraded at that point that the decoration is no longer apparent. The lines are a grayish black and there is no slip on the vessel. The ladle decoration while of all-over style has definite zones, the bowl and the handle. Each was treated somewhat differently. The entire interior of the vessel was divided lengthwise by two parallel lines. The bowl was set off from the handle by drawing lines from the rim perpendicular to the main central lines. The two sections of the bowl formed by the main bisecting lines were ornamented with similar panels composed of concentric, plain-line triangles. Ticked lines furnished the elements for the handle embellishment. The general aspect of this ladle is highly suggestive of the wares from the Pueblo I sites of the Kayenta district. The pigment shows the same quality of running into the slip, and the design itself is quite like the many from that region.

One of the most interesting groups of designs in the whole collection is that illustrated in Figure 35. The elements used in their composition are decidedly simple and typical of the period. Solid triangular figures, dotted triangles, parallel and stepped parallel lines, and squiggled lines are all that were needed in the development of the intricate patterns. The actual decorations are characteristic of the middle and late phases of Pueblo I. They were carried over into the beginning of Pueblo II to some extent in the Chaco range of cultures. The latter forms are easily distinguished, however, because of the fine enamel-like slip which the vessels bear. Designs which are unquestionably of the same style as those pictured have come from sites in the Chaco Canyon[11] and its vicinity and fragments from bowls with the same type of decoration may be picked up at many small ruins in the region of Zuñi and as far south and west as the old Long H ranch, 18 miles north of St. Johns, Ariz. The decorations are among the most distinctive of any in the Pueblo cycle.

Examples of the negative element in designs are to be seen in Figure 35, *a*, *b*, *d*. That is, the unpainted space in the bottom of the bowl forms a figure. The three designs referred to show three different forms of the feature. What they may have been intended to represent, if they were intentionally done and not an accidental result of the type of patterns, is not known and it is practically impossible to give them any kind of a name. It is sufficient to call attention to them.

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[11] Judd, N. M., 1924 b, pl. 6.

The pigment of both *a* and *b* is a thin black, and the decorations are scarcely discernible because the vessels were not given a slip. Their paste is a dark brown in color and materially lessens the effectiveness of the designs. On the other hand, *c* and *d* were painted with a good black pigment on carefully slipped bowls and as a result show quite distinctly.

There is only one other feature in connection with designs or figures on bowls which is of special interest and that is the occasional lines found on the exterior of vessels. (Pl. 31.) They are rather curious because they are similar to those found to a large extent on bowls of later periods coming from ruins of the Chaco cultures. The lines on the latter were presumably for the purpose of emphasizing the line break. The line break consists of a small unpainted space on the rim of a vessel, which some of the modern Pueblo Indians explain on the ground that if the line was made a complete circle the spirit of the vessel could not pass in or out at will and the container would crack. The curious feature about the Piedra examples is that al-

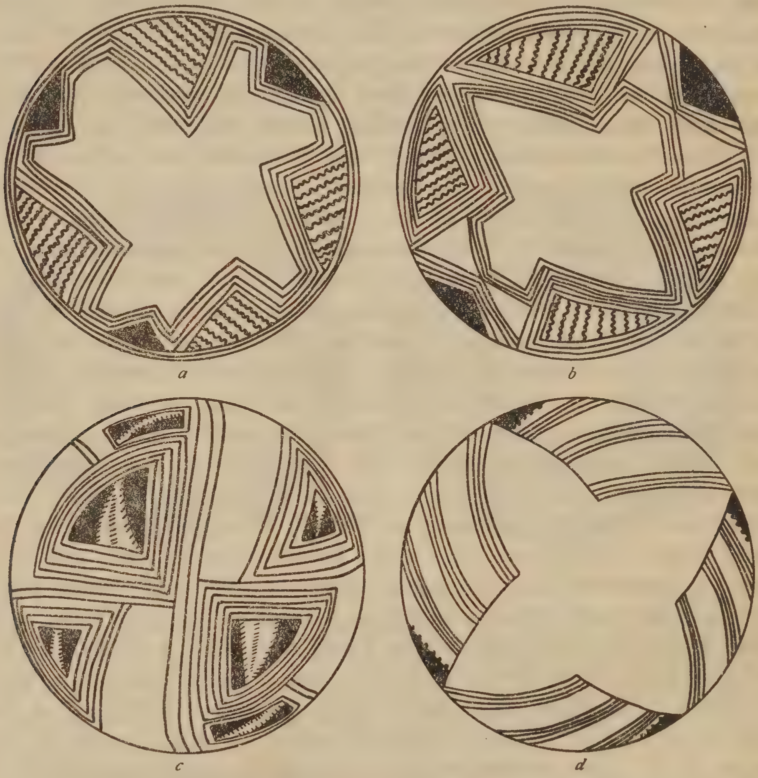

FIGURE 35.—More elaborate forms of bowl decoration

though the line break emphasizing lines are present on the exterior there is no break in the lip line at the point where they occur. This would indicate that the emphasis came first, the break second in the development of the idea which, in other words, would seem to be putting the cart before the horse. Although all of the rims on the bowls in the collection from the Piedra show that they were painted, most of them are so abraded that it is not possible to tell whether they had a line break or not. A few show clearly that in their particular cases it was absent. It may well be that the line break was a very late Pueblo I or early Pueblo II development.

Seed jar decorations vary in position according to the shape of the vessel on which they were painted. On the globular forms they occur on the sides, while on the flat-topped variety they were placed around the orifice. A good example of the globular form is illustrated in Plate 20, *b*. The decoration consists of similar panels placed on opposite sides of the jar. Seed jars with decorations on the upper portion around the opening are illustrated in Plates 20 and 21.

Some of the most elaborate patterns in the black-on-white group, other than the bowl designs, are found on the flat-topped seed jars. A characteristic group is illustrated in Figure 36. As will be seen from the drawings, the same simple elements used in bowl decoration form the basis for all the designs. In *a* the elements are parallel lines and solid triangles, the latter forming a band around the opening at the top of the jar. The main elements in *b* are again the parallel lines grouped in series of five, six, and seven to form the figures which were placed at intervals around the opening. Triangular figures of one form of the so-called bird symbols placed at the angles of the main figures complete the design.

More involved designs are to be observed in Figure 36, *c*, *d*, although both are composed of typical elements. In *c* parallel lines and dotted triangles were combined to make a very pleasing ornamentation on the jar. The spacing of the figures is better than generally is found, but the design is characteristic of the period. The sole elements in *b* are parallel lines and the simplest form of the bird symbols. The parallel line figures were so placed that they form a four-petaled flower symbol about the mouth of the jar. The bird figures were used to embellish the triangular spaces between the parallel line groups and serve to emphasize their petal-like character. Considered from every point of view this is one of the best conceived and most carefully executed designs in the entire group.

All of the vessels the designs from which are illustrated in Figure 36 were treated with a slip before the pigment was applied. The latter in *a* and *b* has a marked brownish tone; *b* especially borders on the red-brown. The paint on *c* and *d* is a fairly good black.

Only a few of the large jars were ornamented and their designs are quite simple. The decorations were placed in the upper portions, around the shoulders or above it, and around the neck. Parallel stepped lines with filled-in corners were painted around the shoulder of the jar illustrated in Plate 18, *a*. The only additional pigment on the vessel is around the ring of the orifice. The pigment is brown in spots and a fairly good black in others. A very thin slip was applied to the jar before the decoration was painted on it.

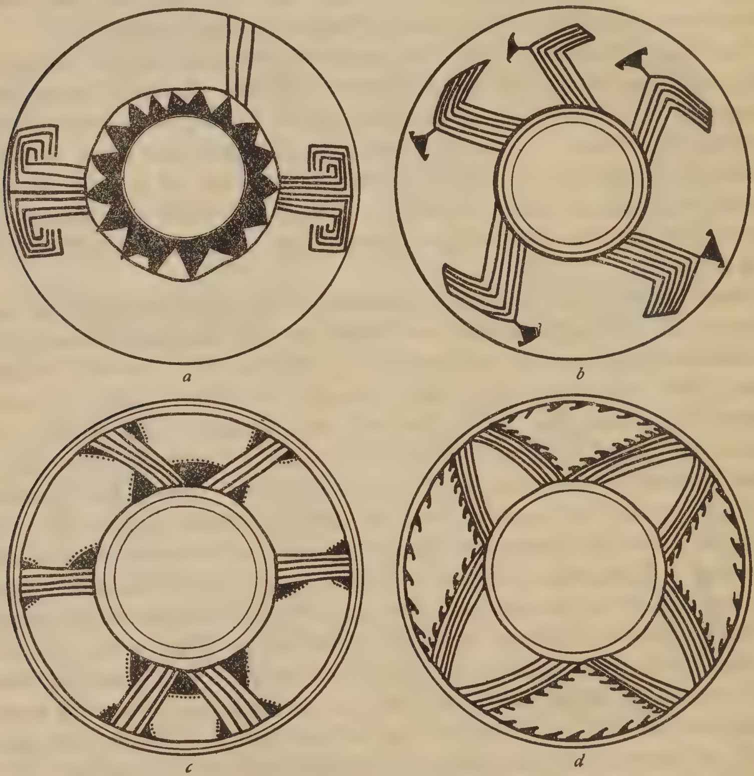

FIGURE 36.—Design from seed-jar tops

Similar panels placed on opposite sides of the vessel form the plan of decoration for Plate 19, *a*. The elements used were parallel oblique lines and filled-in corners. The latter resulted in solid triangular and solid quadrangular figures. The pigment is a good black and the vessel bears a slip. Discoloration due to a secondary burning at the time when the house in which the fragments were found was destroyed by fire has dimmed the design to a certain degree. This vessel illustrates also the combination of banded neck and painted ornamentation.

Solid triangular figures in simple bands, one around the neck and the other around the shoulder, form the ornamentation on Plate 19, *b*. The pigment is brown and the jar was treated with a slip.

The Piedra jars differ from the La Plata specimens described by Mr. Morris in the matter of decoration. None of the latter have any form of painted ornamentation on them.[12]

Most of the pitchers have no designs on them, but the few which do generally bear patterns composed of characteristic elements. One example has only a series of five parallel lines painted on the handle. (Pl. 22, *a*.) Another has two "sunflower" symbols placed on opposite sides. (Pl. 22, *f*.) Parallel lines and conventional bird figures were used in the band design around the upper part of the small gourd-shaped pitcher illustrated in Plate 23, *a*. Similar bands consisting of a series of indeterminate elements, possibly crude forms of the ticked triangle, were placed around the shoulder portion of the pitcher shown in Plate 23, *b*. On all of these examples the lip of the orifice was painted and not one shows a line break.

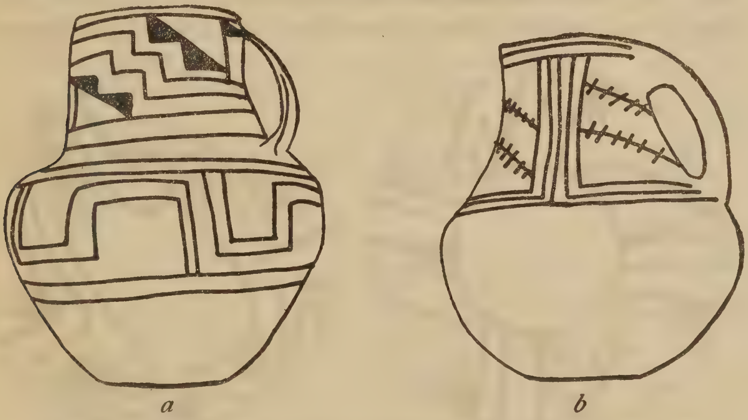

FIGURE 37.—Characteristic design elements used in pitcher decorations

Solid triangular figures bordered by parallel stepped lines were combined with parallel stepped lines to make a typical Pueblo I pattern on the pitcher illustrated in Figure 37, *a*. The decoration was applied in two zones, one around the body and the other around the neck. Pitchers with very similar designs have been found in the Chaco Canyon and the Kayenta district. The triangular figure with bordering stepped lines is another good example of the use of a textile pattern on pottery. This same style of decoration is to be found on some of the headbands of the late Basket Maker period.[13] Here, again, is an illustration of the breaking away from basketry symbols.

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[12] Morris, E. H., 1919 b, p. 197.

The second pitcher (fig. 37, *b*) has but one zone of decoration and that the upper portion of the vessel, from the shoulder to the rim. The design is composed entirely of parallel-line and ticked-line elements. Both *a* and *b* vessels have a thin slip and the pigment varies from a good to a brownish black.

Black-on-Red Wares

So small a number of vessels of this group is in the collection from the Piedra district that an extensive consideration of the designs is not possible. Each decoration is of a style peculiar to the one vessel, although some of the elements are in common and also are like those of the black-on-white group. The black of the pigment on the red containers is not a good, clear tone, but has a tendency to a semitransparent quality, a slight brownish cast, and a softness of appearance which is typical of the early black-on-red forms.

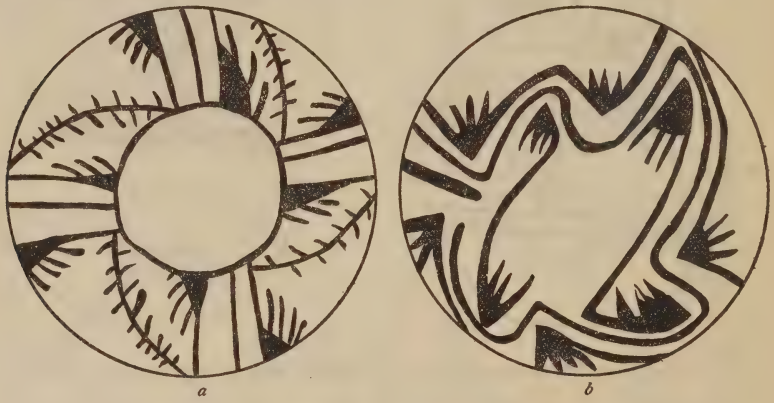
a *b*

Figure 38.—Patterns from black-on-red bowl interiors

One bowl has a band design composed of four similar panels. (Fig. 38, *a*.) The elements consist of ticked lines and ticked triangles. This particular decoration is one which might just as well have come on a black-on-white bowl. The second pattern (fig. 38, *b*) is of an entirely different nature and expresses a boldness and dash not generally found on any but the black-on-red vessels.

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[13] Cummings, B. S., 1910, p. 10.

A simple design which is highly effective consists of a single, broad, heavy line which follows a rectilinear meander across the middle of a bowl. (Pl. 30, *e*.) The concept behind this decoration was of a quality rarely found in the early Indian art. The very simplicity of it adds greatly to its effectiveness. Another red bowl, with decoration too faint to show in the illustration, included in the same photograph (pl. 30, *f*) is of interest chiefly because of the clearness with which the marks of the slip mop stand out. The color on this vessel was obtained through the use of a secondary wash.

The two seed jars (pl. 24) have interesting designs. The one on *a* has four triangular figures pendent from the rim of the orifice, framed by a series of three bordering lines. The latter consists of one broad heavy line in the center paralleled by lighter, narrower ones on each side. The decoration on *b* is unique and is quite suggestive of basketry. The vessel has two forms of patterns in the four figures painted on it. Those on the sides are similar and those on the ends (the jar is oval in shape) are alike. The latter have concentric squares as the main elements.

The tall cylindrical vessel with lateral opening (pl. 33, *b*) has a decoration on its back (fig. 39) which is more like some of the black-on-white designs. Parallel lines and pennantlike triangular figures are the main elements from which it was formed. There are traces of a somewhat similar design on the front, or side in which the opening is located, but the surface on that portion of the jar has been so abraded that it is not possible to restore the pattern.

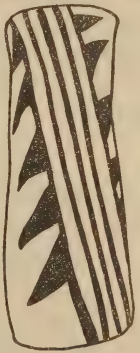

FIGURE 39.—Decoration on back of red jar

The red vessels with a shiny black interior bear no decorations and need not be considered further. As a matter of fact they formed so small a percentage of the pottery of the Piedra district that they may be designated as extremely rare.

POTSHERDS FROM THE C DWELLINGS

As stated in the introduction to this section of the report, only pottery fragments were obtained from the C houses. For this reason any extensive discussion of their forms is out of the question. The potsherds do suggest, however, that many of the same shapes prevailed and also that the decoration of the painted wares was quite like that described in preceding pages. The chief point of difference in the designs is that the latter seem to have had more curvilinear elements, the interlocking volute especially being favored.

The main point of significance to be noted is that the only pieces from corrugated culinary vessels found during the entire course of the 1928 investigations came from the C dwellings. (Pl. 36.) The indented corrugated form of cooking pot, as previously stated, is one which is typical of the prehistoric Pueblo periods beginning with II. The earlier forms, of which the Piedra sherds are good examples, show broad coils and deep indentations. The later styles have a narrow coil and small indentations.

On the basis of the potsherd evidence, it may be concluded that the C houses must have bordered on the Pueblo II period. Perhaps it was during the time when this kind of house was being built that the transition from Pueblo I to Pueblo II took place. The dwellings may not actually have been occupied during the Pueblo II stage but, at least, they were so late in the first stage that it was possible for typical Pueblo II potsherds to find a resting place in them.

SUMMARY

The pottery from the Piedra sites furnishes information of considerable value with respect to the Pueblo I period. It shows clearly many changes in the transition of the industry from the late Basket Maker to the Pueblo periods. Outstanding in the new features are: Banded instead of smooth necks on the culinary vessels; additional variations and new developments in vessel shapes, including the prototypes of the Chaco cylindrical vases and many effigy forms; the development of the slip or wash of "liquid" clay; elaboration of painted decoration and the turning to woven materials other than baskets as a source for designs; the ornamentation of large jars, pitchers, seed jars, and other vessels in addition to bowls and ladles.

Considering the pottery as a whole the main features are: A dull gray to clear white paste with sand or powdered rock for tempering; vessel shapes include full-bodied jars with long tapering necks and constricted orifices, full-bodied jars with short cylindrical necks and constricted orifices, globular-bodied jars with short necks and wide orifices, full-bodied vessels with an ovoid or elongated spherical shape with short necks and wide orifices, seed jars, bowls, pitchers, ladles or dippers, bird forms, cylindrical vases, double-lobed jars, effigy forms and eccentric shapes; smoothed surfaces on the exterior of containers, with the exception of the banded necks on culinary and some of the nonculinary jars, but no indications of the use of a true polishing stone; a slip on 46.3 per cent of the containers; the survival of many forms typical of the late Basket Maker period in their characteristics; the presence of "fugitive red" on the exterior of many pots; the predominantly rectilinear designs composed of dots, stepped or zigzagged and squiggled lines, ticked and dotted lines, solid triangular figures, ticked and dotted triangles, triangles with tips, circles, checkerboarding, and occasional realistic and curvilinear symbols; the boldness in the conception of the designs with a marked lack of skill in their execution; the appearance of lines on the exterior of bowls analogous to the line-break emphasis of later periods; and the late appearance in practically negligible quantity of the indented corrugated ware.

ADDITIONAL CLAY OBJECTS

Fired clay objects in the collection from the Piedra district are not restricted to pottery containers. There was another group consisting of tubular clay pipes or the so-called cloud blowers. (Pl. 37.) Objects of this type have been given the latter name because of the use of similar ones by some of the modern Pueblo peoples in some of their ceremonial observances. During the progress of certain religious performances small puffs of smoke, supposedly symbolic of the rain clouds, are blown toward the cardinal points of the compass by priests using pipes of this form. There is no way of knowing whether they were used for such a purpose during the prehistoric periods or not, but it is quite possible that they were. In form they are scarcely convenient for pleasure smoking. Moreover, the use of tobacco in the latter sense was probably not through the medium of a pipe but of a cigarette wrapped in corn husk. Evidence for the latter is far from conclusive, but numerous indications of a knowledge of the cigarette have been found.

Although the collection from the recent investigations contains no example of an elbow pipe, the form was known along the Piedra. During the 1922 excavations a series of clay pipes, shaped like the modern soap-bubble pipe, were found. They not only were of the bowl and stem form, but in one instance there were two bowls, placed side by side, served by a single stem. In general texture and paste quality they correspond to the cloud-blower forms.[14]

The cloud-blower pipes are tubular or cone-shaped, examples of both forms being found. In both the bowl portion, if the cavity for holding the combustible may so be called, constitutes about one-half of the total length. The remaining portion is solid, although perforated by a small hole running through it from the small or bit end to the bottom of the bowl. The pipes were made from a clay paste similar to that used in the pottery vessels. On the whole the clay was not as carefully worked as that in the nonculinary containers, but an occasional form shows a hard compact quality suggestive of those vessels. The paste is more like that of the culinary type of pot.

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[14] Jeancon, J. A., and Roberts, F. H. H., jr., 1923, pl. 9.

The cloud blowers were plain in a majority of cases. Now and then one is found which has an incised decoration composed of dots (pl. 37, *c*), or a form of ornamentation in appliqué. The latter usually consists of some realistic life form molded and stuck onto the surface. No complete specimen exhibiting this feature was obtained in 1928, although a number of fragments with portions of figures on them were found. In all cases the latter suggest a marked resemblance to a frog. (Pl. 37, *i*.) An elbow pipe with such a decoration was found in 1921 at a site farther north along the river.[15] If the figures were intended to represent the frog it seems all the more probable that the pipes belong to the ceremonial, cloud-blower group, because the frog is closely associated with rain and rain-bringing practices by the Pueblo Indians.

There is no great variation in the size of the pipes. The smallest has a total length of 1⅞ inches (4.6 cm.) and a diameter at the bowl of three-fourths of an inch (1.9 cm.). The largest has a total length of 2⅛ inches (5.5 cm.) and a diameter of seventh-eighths of an inch (2.2 cm.) at the bowl end.

The chief distinguishable difference between the cloud blowers of this period and those of the late Basket Makers is that in the former the bowl is about one-half of the total length, while in the latter it only approximates one-fourth. Later periods seem to be characterized by an even greater depth of bowl. On the whole it may be said that the cloud-blower form persists and is consistent throughout the horizons in which it has been found.

One interesting specimen included in the group of pipes was not, strictly speaking, such an object. (Pl. 37, *e*.) It is in reality a handle from a gourd-shaped pitcher which had been broken off from the vessel. The fractured edges were rubbed down and carefully smoothed and an attempt was made to drill a hole through the tip end. The perforation was never completed, however. The writer found an almost identical specimen in 1923 at a site on the north side of the San Juan River several miles east of Arboles.[16] The latter had been completed and used and there seems to be little question but what a similar intent was behind the secondary working of the present specimen. That it was not a fortuitous fragment was shown by the fact that it was one of the mortuary offerings accompanying a burial. One purpose suggested for the object was that of a horn on a ceremonial dance mask or headdress of the

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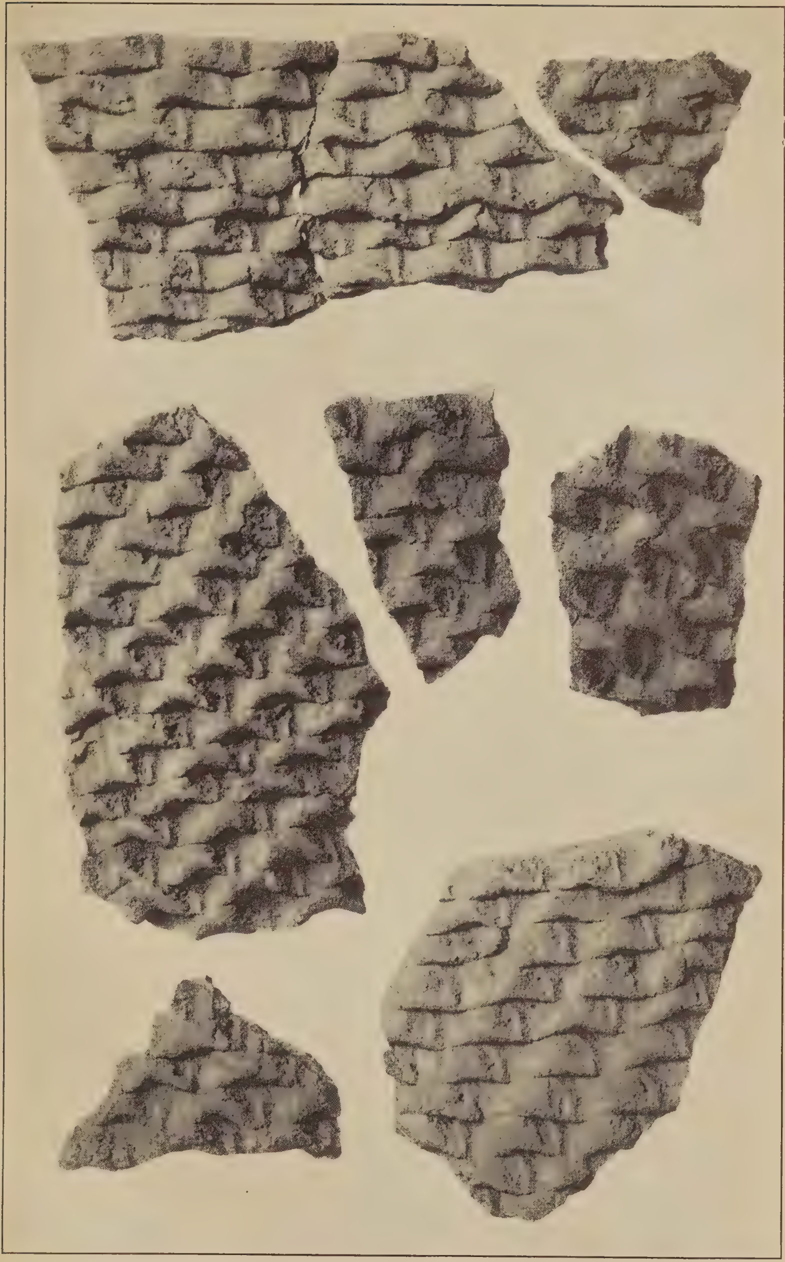
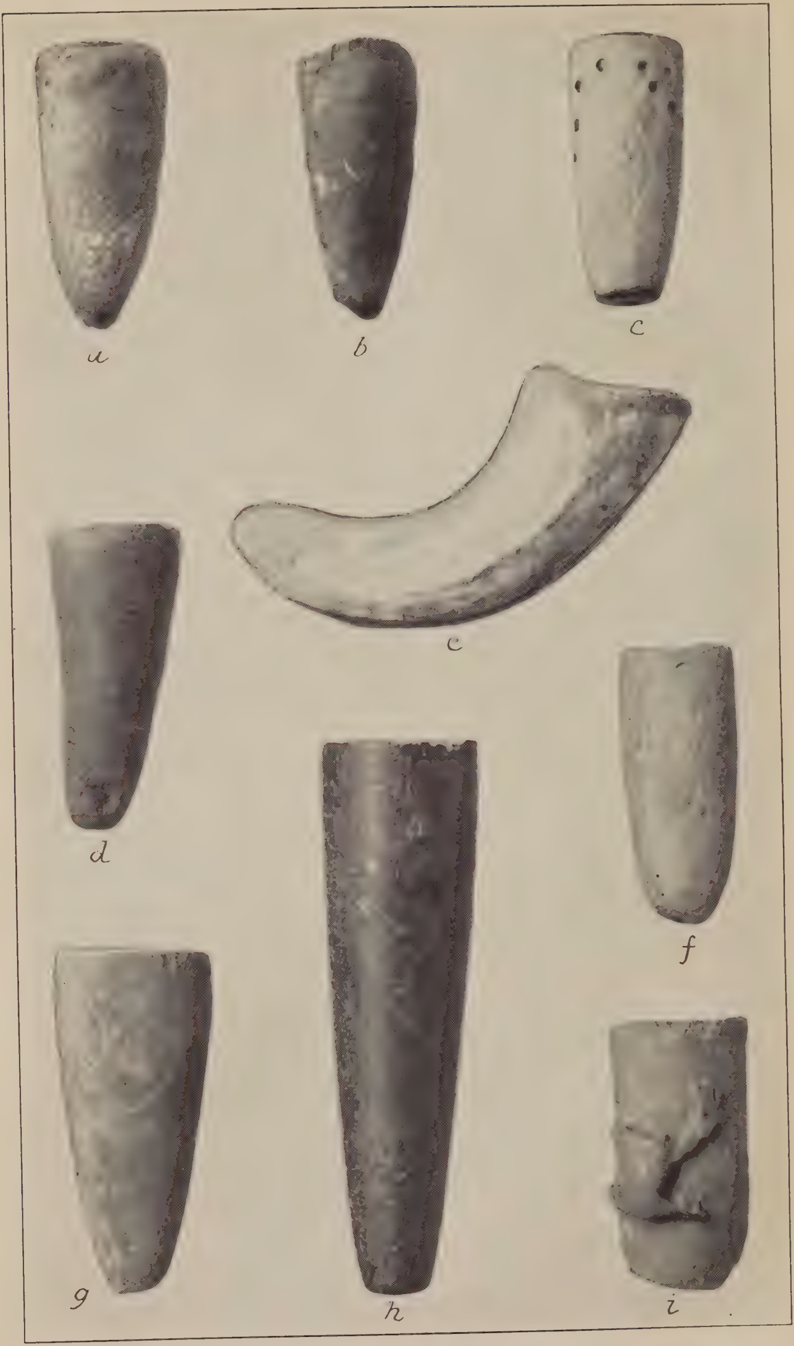
[15] Jeancon, J. A., 1922, p. 26; pl. XXIII.

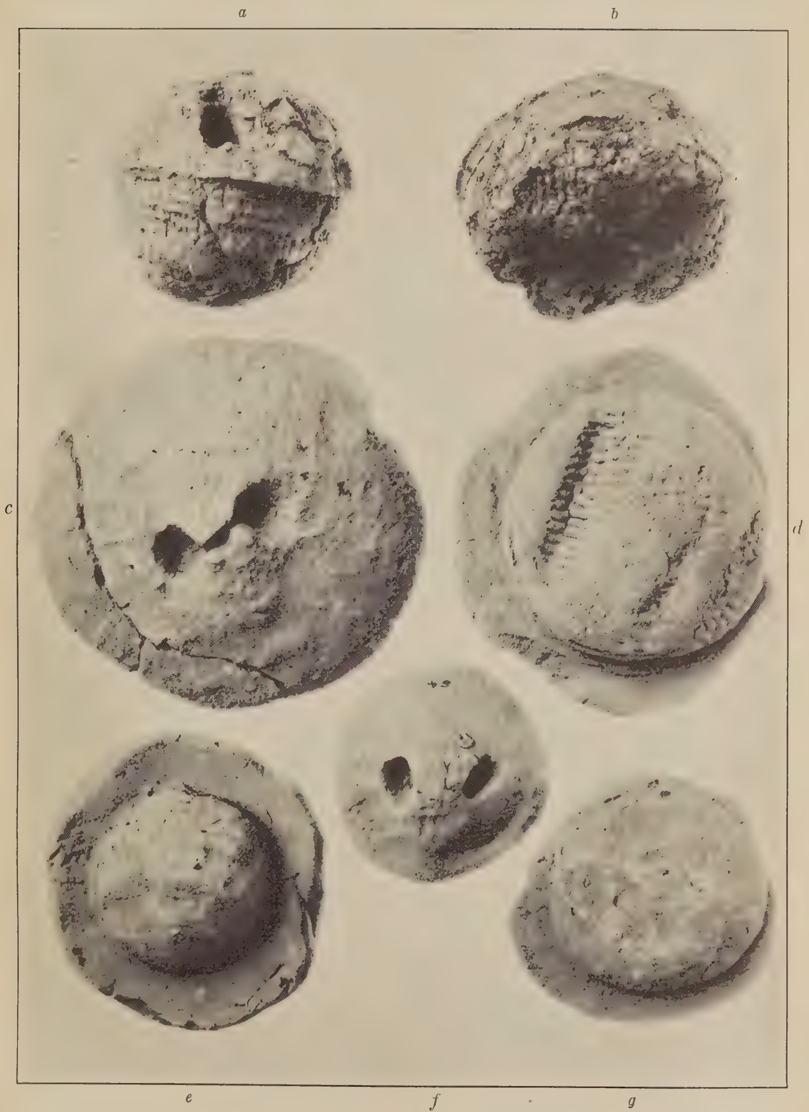
[16] Roberts, F. H. H., jr., 1925, pl. 18, p. 70.



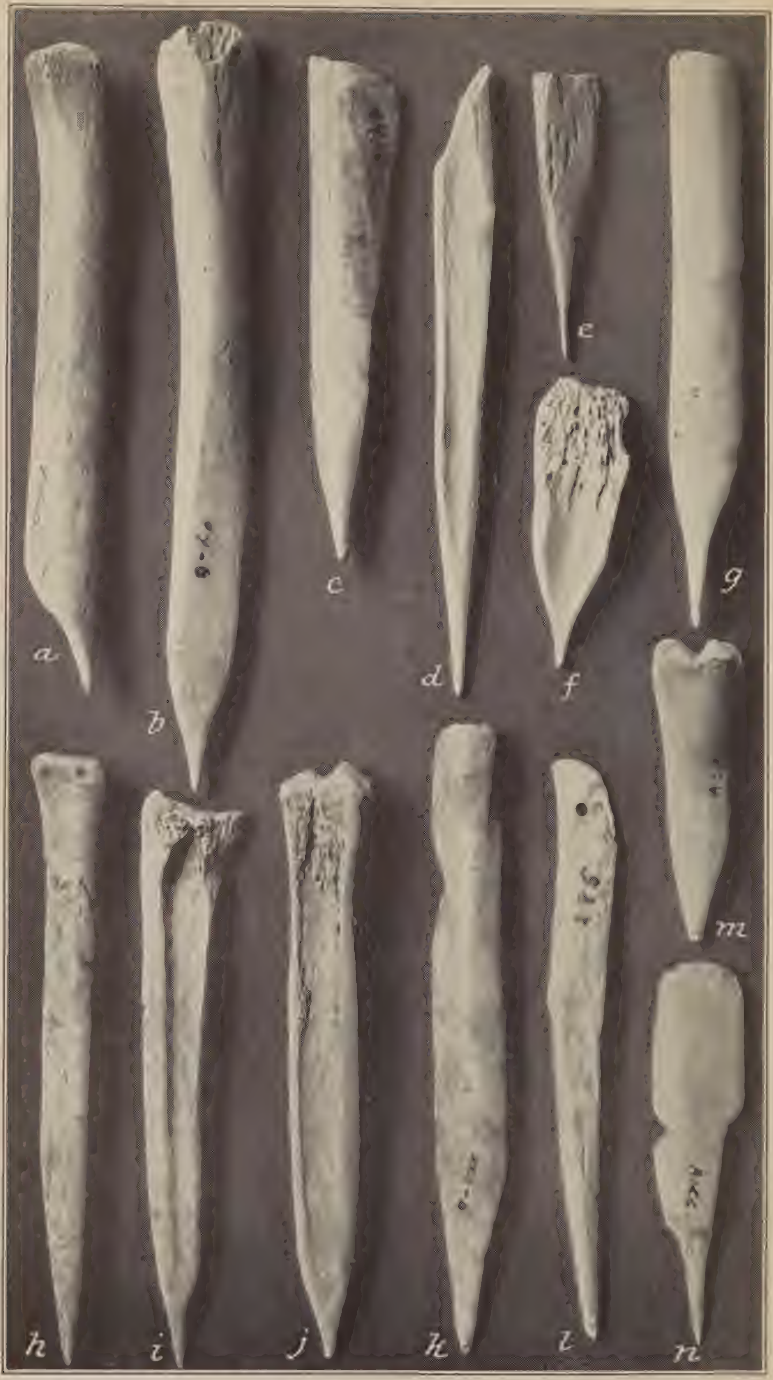
POTSHERDS FROM INDENTED CORRUGATED WARE



PIPES OR CLOUDBLOWERS



CLAY STOPPERS AND POT LIDS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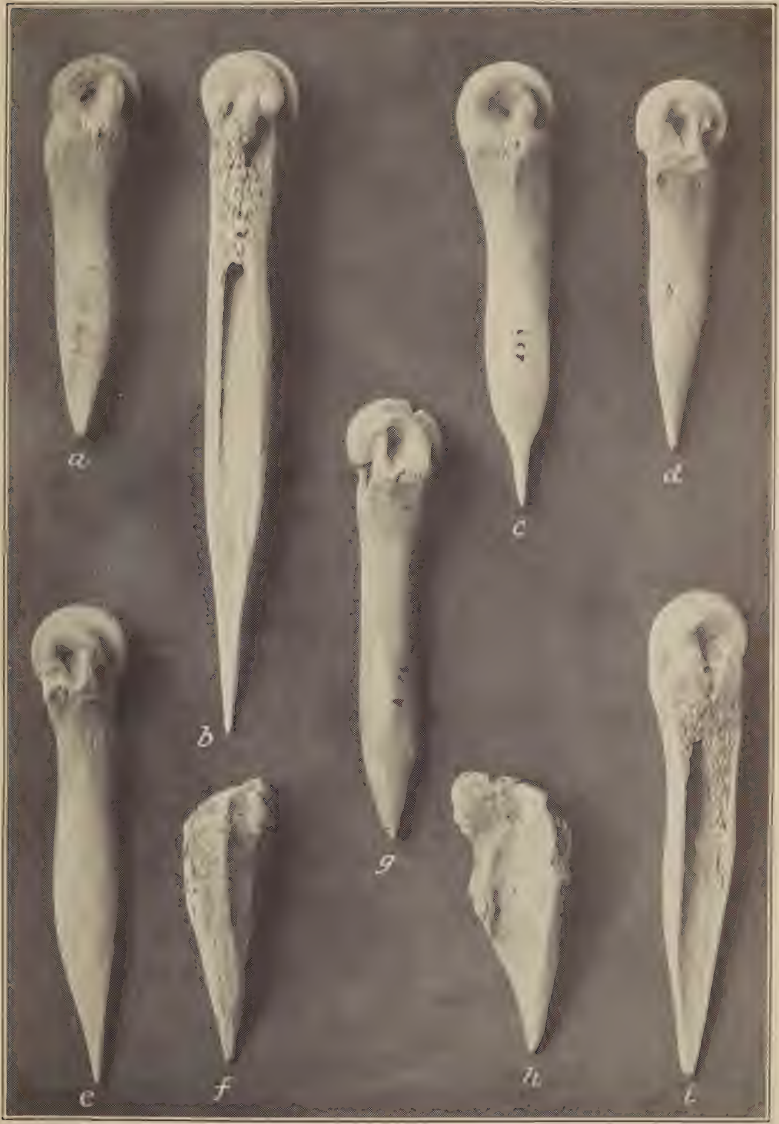
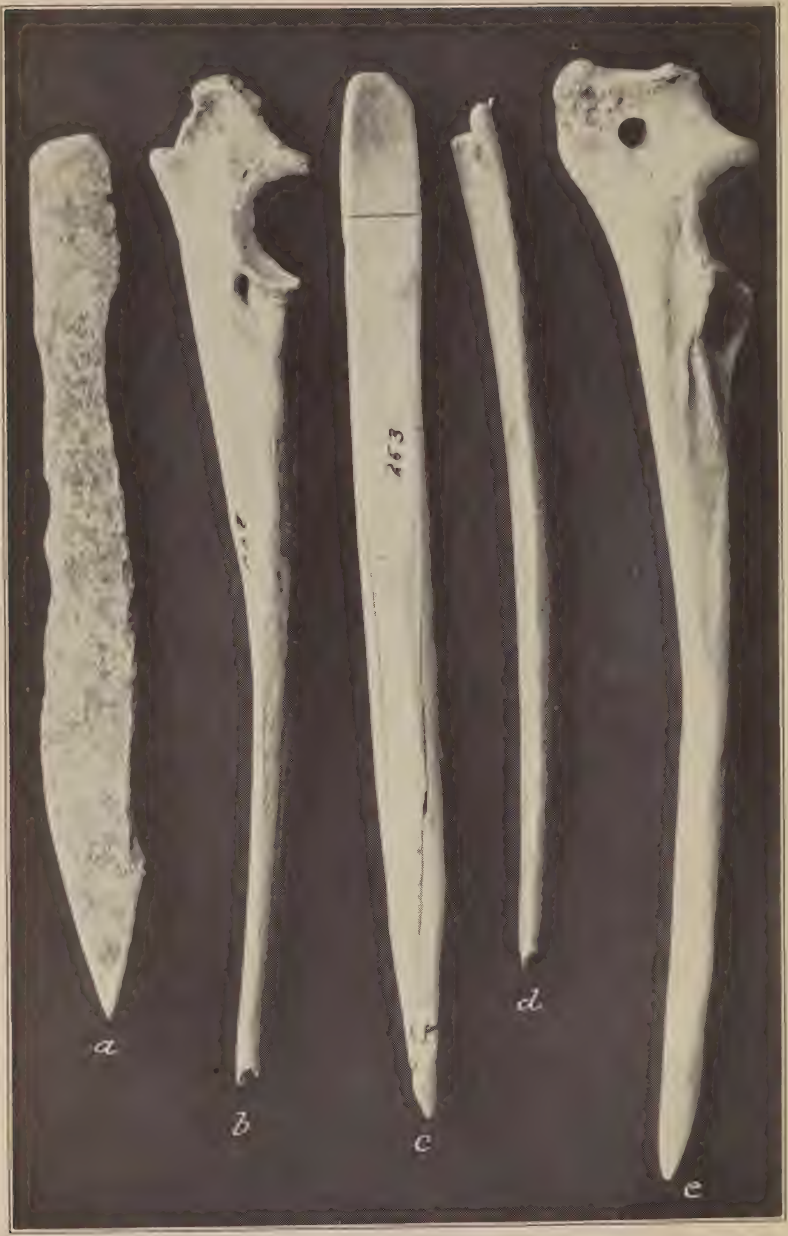
BONE AWLS

Sharpened splinter group.



BONE AWLS

Examples of forms made from specially cut pieces.



BONE AWLS

Specimens illustrating slight modification of original bone.

mountain-sheep type. This does not seem at all likely, however, as there were no holes drilled at the base end to provide for its attachment. Furthermore, no satisfactory evidence has thus far been obtained to show that the ceremonial mask was known before very late pre-Spanish times. In fact many southwestern investigators are convinced that it is the result of Spanish influence. This point is debatable on the ground that the mask may well have been an introduction from the Mexican cultures late in the prehistoric periods. There is no question that present evidence denies its existence in the early periods. Hence the probability that the Piedra object was not a horn for such a headdress.

Two stone pipes of the tubular form are included in the illustration of pipes. (Pl. 37, *g*, *h*.) These properly belong under the heading of stone objects, but for convenience were placed with the clay forms. They will be discussed, however, in their proper place.

Another group of clay objects consists of a series of jar and basket stoppers. (Pl. 38.) These specimens present a rather puzzling problem, because the question immediately arises as to whether they were intentionally fired or whether that end was accidentally accomplished by the burning of the houses. They are simple in form and indicate that they were merely plugs pressed into the jar or basket orifice, while the clay was still moist, to seal the contents. The tops and edges were partially smoothed over by rubbing with the hand, the marks of which may still be seen on a few of the specimens. Some of the lids have small depressions punched in their tops to serve as finger holds. (Pl. 38, *c*, *f*.) Even in an unfired state the stopper would be sufficiently durable, after natural drying, to fulfill the desired function and could be lifted out and replaced at will.

The great abundance of these objects in the Piedra ruins and their general scarcity in most sites which have been similarly exposed to moisture suggests decidedly that it was the unintentional firing as a result of the burning of the buildings that has preserved them. Mr. Morris found an unfired example at the Aztec ruin,[17] and they have been found at various early sites in Utah. They occasionally appear in other districts and were probably quite widespread in their distribution. The lack of extensive numbers of the objects in collections is probably due to the fact that under ordinary conditions they were not fired and as a consequence quickly disintegrated from moisture.

The Piedra plugs are of two general forms. One is very flat with a large mushroomlike head and short stem (pl. 38, *c*–*g*), while the other has practically no head, is simply a long stopper rounded off at the top. (Pl. 38, *a*, *b*.) A majority of the latter show distinctly that they were placed in basket necks. The flat forms appear to have been associated with pottery. The heads on the latter range between 2¾ and 5¼ inches (7 and 13 cm.) in diameter. The stem or stopper portions vary from one-fourth to one-half inch (6.4 mm. to 1.27 cm.) in length. The other type ranges from 2½ to 3½ inches (6.35 to 8.9 cm.) in diameter and 2 to 3¾ inches (5.08 to 9.5 cm.) in length.

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[17] Morris, E. H., 1919 a, pp. 407–414.

Basket impression is clearly shown in the sides of Plate 38, *a*, and *b* and *d* bear impressions of ears of corn. The latter was probably stored in the basket and jar in which the stoppers were placed.

Bones and Bonework

The bones and bone implements found during the progress of an archeological investigation have a threefold value. They furnish a record of the animals which were present in the region at the time when the site was occupied, indicate possible forays into other regions where a different kind of game was to be found, and furnish material for a study of the various types of tools made from this substance. The bones and implements made from that material found at Piedra sites were not numerous, a condition similar to that found by Morris in his La Plata work,[18] but even in the rather small collection a fairly diverse group of animals, birds, and tools is to be noted. The animals represented are the bear (*Ursus horribilis*), the elk (*Cervus canadensis occidentalis*), buffalo (*Bison bison*), wolf (*Canis occidentalis*), fox (*Vulpes macrourus*), the mountain sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), jack rabbit (*Lepus californicus texianus*), and the dog.[19] Only a few identifiable bird bones were obtained during the excavations. They include the turkey (*Meleagris gallapavo*), golden eagle (*Aquila chrysaëtos*), and probably the red-tailed hawk (*Buteo* sp.). All of these birds are to be expected in the Piedra district.[20]

The implements are of several varieties, considered both from the standpoint of the character of the material used in their manufacture and from their possible function. The material may have been fortuitous splinters sharpened at the end, specially cut pieces, or whole bones with only slight modifications. Functionally the tools may be classed as awls, spatulate awls, punches, flaking tools, and chisels. Additional objects, not strictly speaking implements, include knife handles, whistles, beads, gaming pieces, and ornaments.

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[18] Morris, E. H., 1919 b, p. 202.

[19] Mr. H. H. Shamel, of the U. S. National Museum, kindly assisted the writer in the identification of these bones.

[20] Dr. A. Wetmore, U. S. National Museum, identified the bird bones and furnished the above information, for which the writer expresses his appreciation.

AWLS

Awls of the sharpened splinter group take the characteristic forms illustrated in Plate 39. The majority of them are fragments from long bones of the deer. An occasional example is found which was made from a rib or some other bone. These are far from being common forms, however, and do not occur in numbers at all comparable to those made from the long bones. Some of the awls in this group show a partial polish at their points. This is the result of use. There are no indications whatever that any attempts were made to smooth the surfaces of these implements.

Awls of the group which consists of specially cut pieces were made, in most cases, from one special bone, the cannon bone of the deer. The latter was especially adapted to such a purpose. There is a groove down the center of the anterior surface which, together with the division of the articular surfaces at the end, provides a natural line along which to split the bone. When this had been done the common practice was to sharpen one end, leaving the condyle at the other. (Pl. 40.) The variation in length exhibited by the different specimens is not due to their having been intentionally so made but, in all probability, to the constant resharpening of the points. Now and then an example is found which has been so worn down that practically nothing but the articular surfaces which formed the handle remain.

Two very unusual awls are illustrated in Plate 40, *f*, *h*. They were made from fragments of deer skull, that portion of the cranium which includes the ear. The writer can recall no other instance in which tools were made from this particular bone, although it is quite possible that there may be unreported examples in collections from other districts.

All of the implements included in Plate 40 would have been very serviceable in the making of baskets, weaving, or in punching holes in skins through which thongs could be passed.

Examples of awls which were made with but little modification of the original bone are shown in Plate 41, *b*, *e*. Practically all that was done to make serviceable implements out of them was to sharpen the ends. Two of the group, *c* and *d*, were given an additional polish but this was not sufficient to alter their forms. The groove at the upper end of *c* is an extra feature which probably had some function in weaving. Both *a* and *c* may be classed in the group of so-called spatulate awls. One end has the customary sharp point of the awl while the other is rounded and slightly beveled. They no doubt had some special service to perform in the weaving industry.

From the viewpoint of the material used, Plate 41 *b*, *e*, are the most interesting tools in the group. Both were made from the ulna of a wolf. The use of bones from this particular animal seems to have been quite rare in the Southwest, as it has not been reported heretofore. Many of the earlier investigators failed to have the bones in their collections identified, however, and it may well be that the lack of mention is due more to that reason than to an actual absence of the type. The other bones illustrated in Plate 41 were from deer.

PUNCHES AND FLAKING TOOLS

One of the main distinctions between punches and awls is in the degree of the sharpness of the pointed ends, which are much blunter and more rounded in the former. Punches were made from fortuitous splinters, from specially cut bones, and occasionally from antler prongs. They were polished or not as the maker desired. There seems little question but what many of the so-called punches were simply awls which had become dulled through use and were not resharpened. Perhaps the whole group resulted in such a fashion.

Closely allied to the punches, and frequently included with them, is a form of implement which may be placed under the heading of flaking tools. This type of implement was generally made from horn or antler and was given a well-rounded point. Flakers were used, judging from the evidence of later Indian groups of which we have documentary knowledge, in the fashioning of stone implements. To produce the desired shape or tool from a stone flake, small fragments were removed by sudden pressure on the desired spot with the blunt point of a flaking implement. Examples of the latter are illustrated in Plate 42, *a*, *c*, *e*. One, *a*, is of bone and the others, *c* and *e*, of well-polished antler tips. There is nothing unusual about the forms, which are of the type found throughout the early periods.

CHISELS

Bone chisels are rather rare in the collections representing early Pueblo periods. Only two examples were found along the Piedra. (Pl. 42, *b*, *d*.) They were made from antler and were polished and sharpened to a comparatively flat edge at one end. Both of these specimens were burned in the fires which destroyed the houses in which they were found and as a result they are somewhat damaged. The total length of the original implement is not represented in either. Such tools would have been of considerable service in scraping or dressing hides, possibly even could have been used in the actual skinning of an animal. They no doubt would have had considerable utility in the smoothing of other objects as well.

KNIFE HANDLES

Several fragments from objects which must have been used in the hafting of stone knife blades were found, but only one complete specimen was obtained. (Pl. 42, *f*.) The latter was made from bone, hollowed out and notched at the ends to facilitate lashing. Some of the incomplete specimens were made from antler.

The hafting of stone knife blades was not uncommon in the Southwest and the finding of portions of handles and a handle in the Piedra sites shows that the people of the district were, so to speak, fully abreast of their times.

WHISTLES, BEADS, AND GAMING PIECES

Only one complete whistle or, as they are sometimes called, bird-call, was found, although fragments from a number of broken ones were obtained. The perfect specimen (pl. 43, *a*) is somewhat unusual in that it was made from a fox tibia and shows very little modification. All that was done to fit it for use was to clean out the interior of the shaft and bore a small vent or stop in the lower end, the upper in the photograph. The exterior gives no indication of smoothing and shows no efforts at polishing. No evidence was found to suggest that flutes were made. Only the single-holed variety of whistle is represented.

The tubes, *b* to *f*, belong to the so-called bead group. This classification includes all short or medium long bone tubes, cut and polished, which might have served such a purpose. Whether they actually did is a debatable question. Practically all of the specimens illustrated show that they were cut from the shafts of long bones from small mammals or birds. The process of their manufacture was such, however, that all means of identification as to the animal or bird from which they were taken was removed. The small hole in *c* was not intentional, so that the object can not be considered as belonging to the whistle group.

The flat objects with incised lines (pl. 43, *g*) are of the type usually classified as gaming pieces. Whether this was their exact function or not is, of course, uncertain. They might have been used as counters or possibly as a kind of dice. Some of the modern Indians play games in which marked sticks are tossed or bounced into the air and the score counted by the number of pieces which land with the marked side up. It is possible that bone pieces of the kind pictured here may have functioned in a quite similar way. There is practically no difference to be noted between the objects of this type from period to period. They seem to remain quite consistent in their form.

Only one example of a bone ornament was found. It takes the form of a button with a series of incised cross-lines on one side. (Pl. 53, *d*.) An incised line runs around the perimeter, setting off the front from the back. The object was perforated at one side, the hole passing through from side to side, not from front to back as would be expected. A portion of the incised surface was broken away at one end of the perforation so that the latter seems larger than was originally the case. The bone has been burned and as a result damaged to a certain extent. It probably was not used in the sense of a button as we think of such an object but rather as a pendant or some form of ornament.

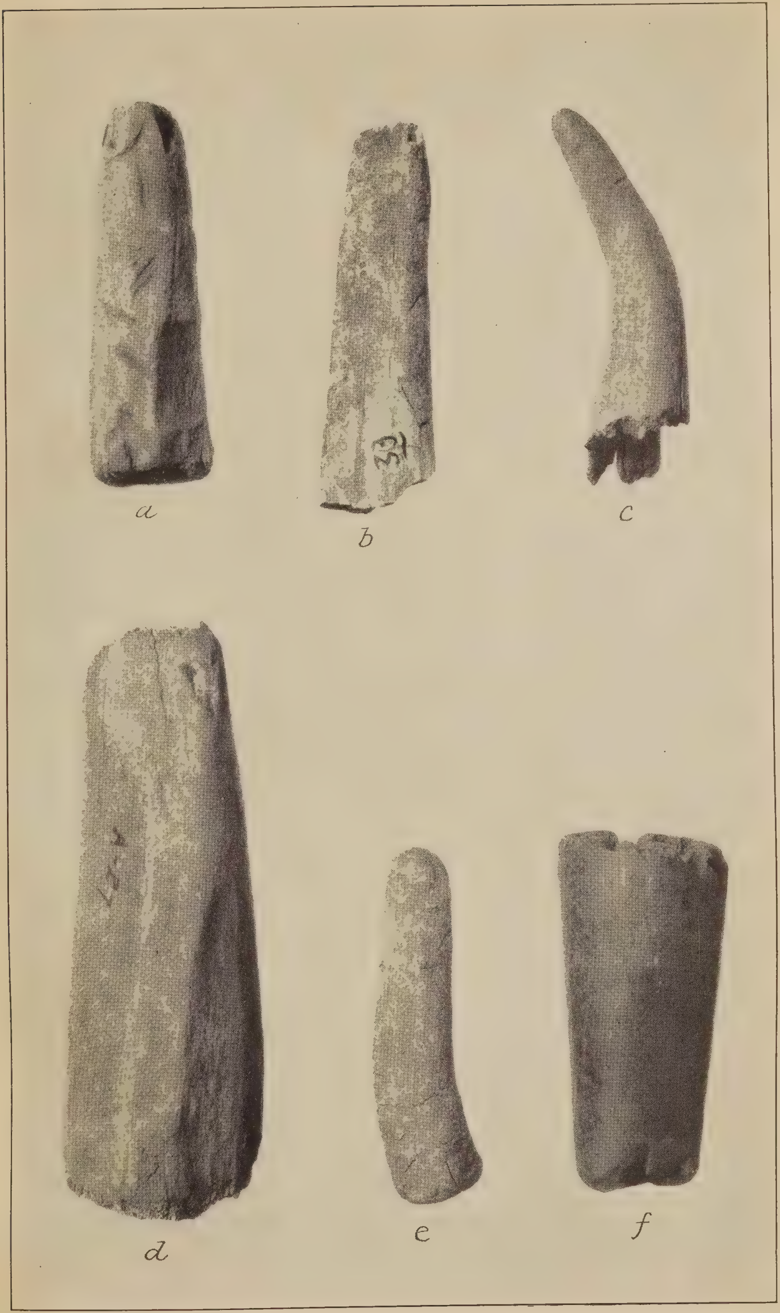
Objects of Stone

Stone tools and implements form a very small percentage of the specimens from the Piedra district. For some reason this material does not seem to have been quite as generally used in the earlier periods as in the later phases. Just why this should have been is not clear. Perhaps after more work has been done in such ruins and village sites a satisfactory explanation will be forthcoming. At the present time all that can be done is to note the comparative scarcity of such objects. Stone was used chiefly in the manufacture of metates or milling stones, manos, mauls, picks and hoes, axes, knife blades, scrapers, spear and arrow points, pot lids, pipes, ornaments, and problematical objects. Some stones were used in their natural state for various purposes.

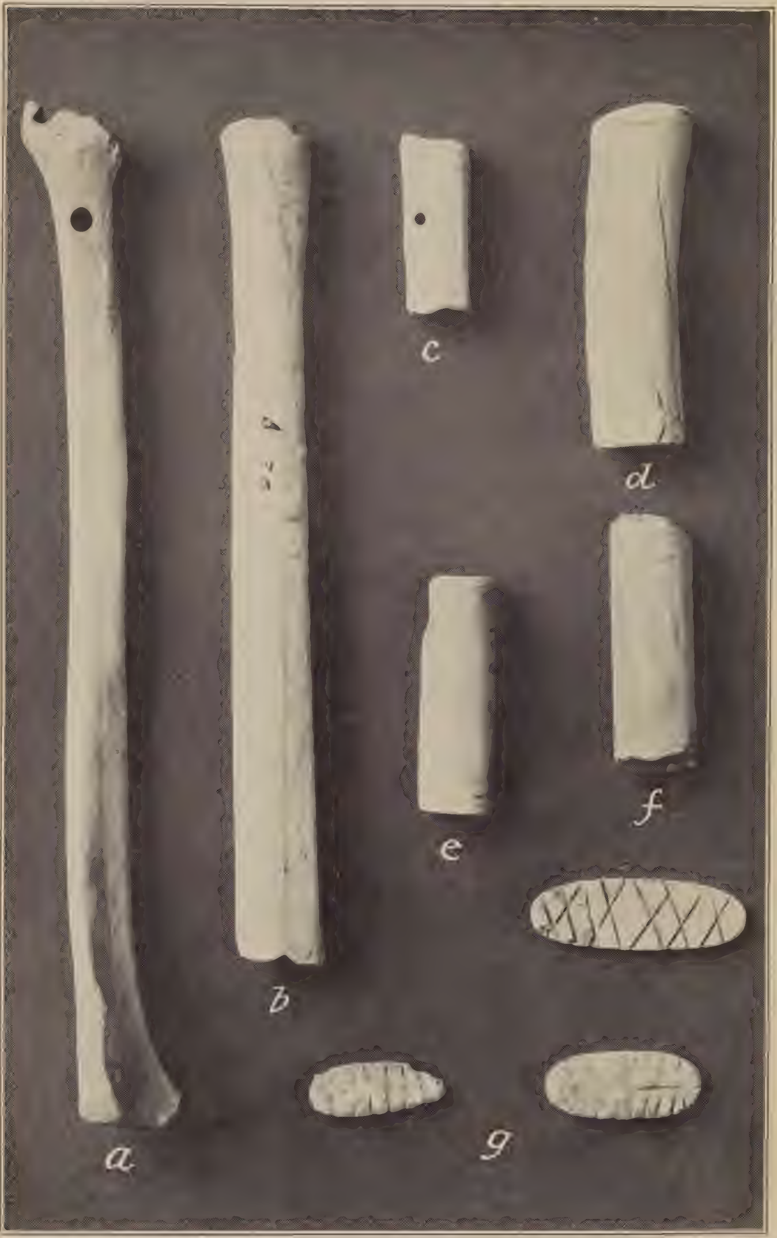
METATES

Metates or milling stones on which the corn was ground were all of one general type. (Pl. 44.) Comparatively thin slabs of sandstone were used in making them. The groove or trough pecked down the center constitutes practically the only modification of the natural material. The remainder of the stone was generally left just as it came from the quarry where it was cut or broken out of the living rock. This is well illustrated in the photograph which shows the irregular contours of the stones as a whole. The form is one which is characteristic of the period and very similar to that of the Basket Maker III metates.

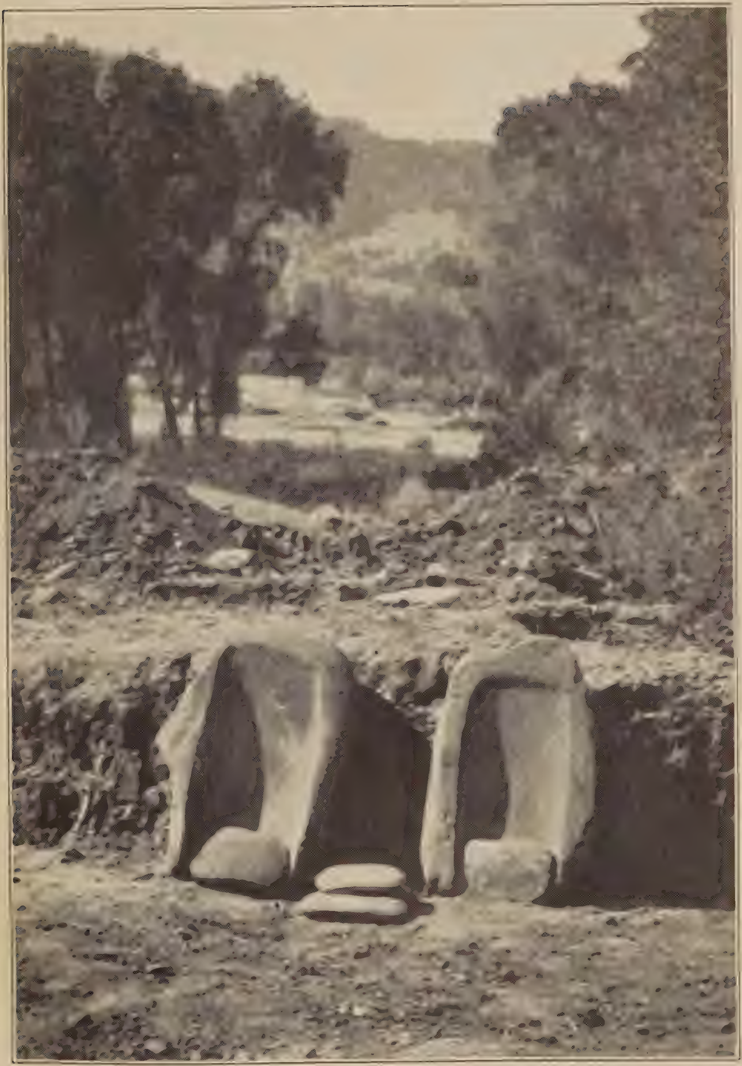
The manos used with the metates, the small stone which was rubbed back and forth over the grain to grind it, are either rectangular or oval in shape with an elliptical cross section. They were made from the same material as the metates. Now and then an example is found which has a slight hollow or depression pecked in one side at the point where the thumb would rest when the object was grasped in the hand.



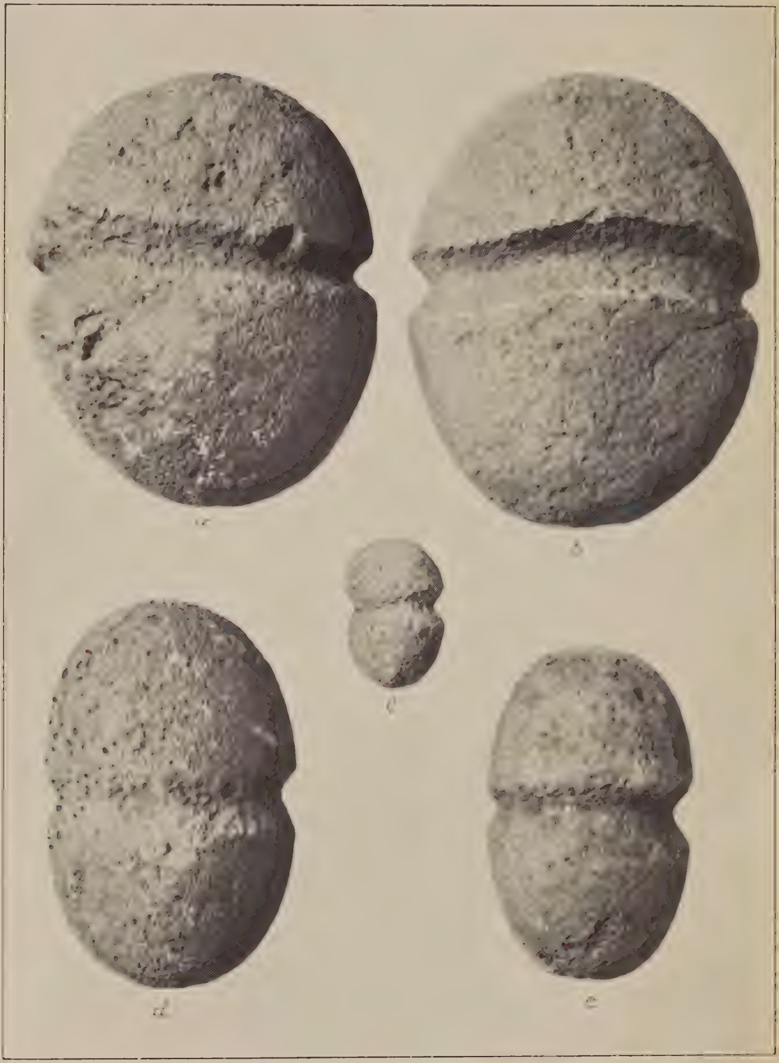
PUNCHES, FLAKERS, CHISELS, AND KNIFE HANDLE



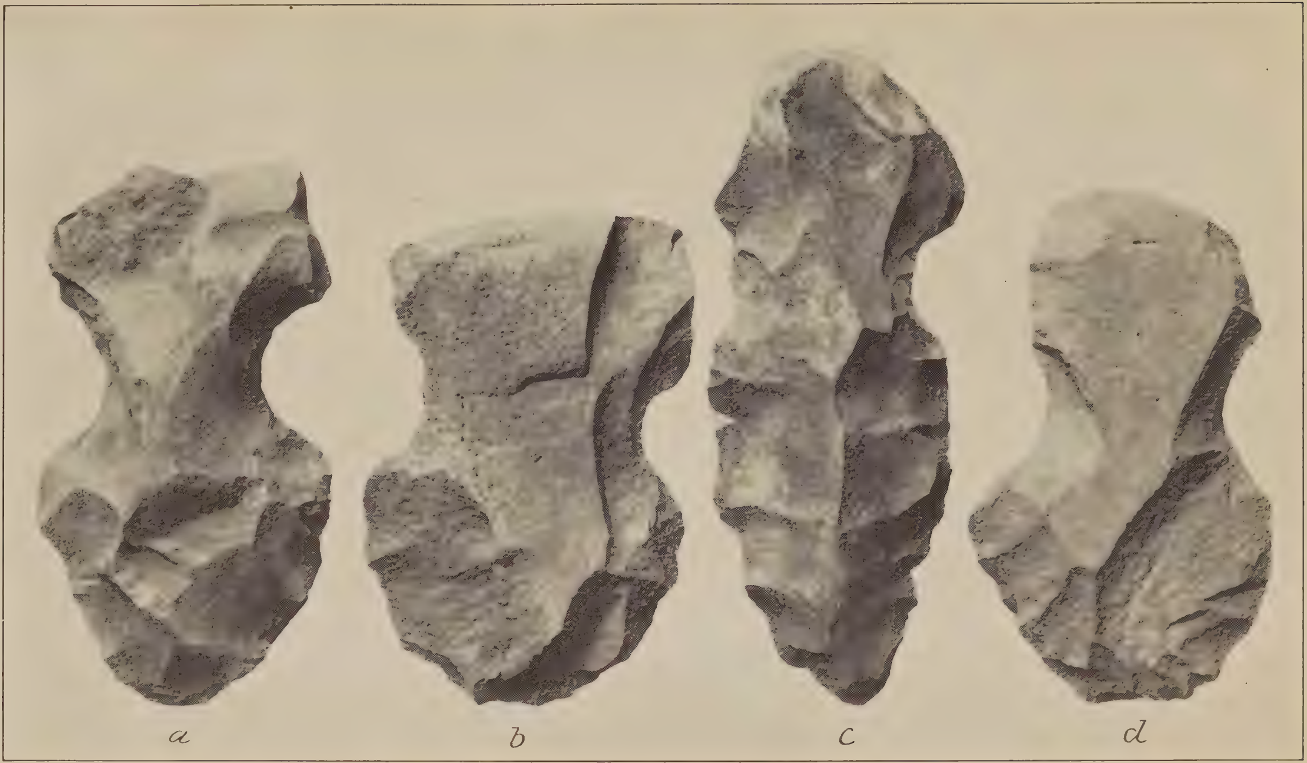
BONE WHISTLE, BEADS, AND GAMING PIECES



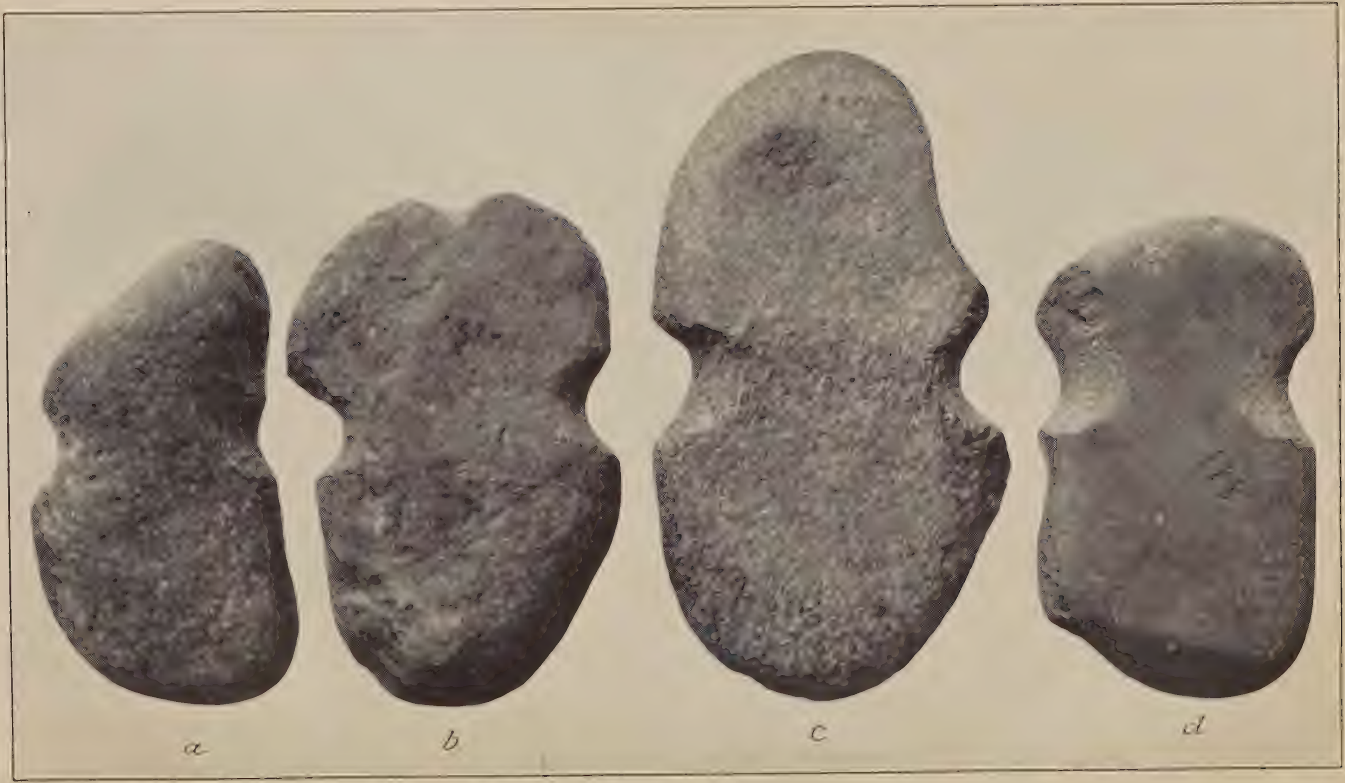
CHARACTERISTIC FORMS OF METATES



MAULS AND HAMMERS



STONE PICKS AND HOES



STONE AX HEADS

The metates range in size from those with a length of 1 foot 6 inches (45.72 cm.) and breadth of 1 foot 2 inches (35.56 cm.) to those with a length of 2 feet 2 inches (66.04 cm.) and breadth of 1 foot 6 inches (45.72 cm.). The thickness of the stone slabs ranges from 2½ inches (6.35 cm.) to 5½ inches (13.97 cm.). The depth of the troughs or grooves varies from one-half inch (1.27 cm.) to 3 inches (7.62 cm.).

MAULS OR HAMMERS

Implements of this group are of one general type, although there is a great variety of sizes. (Pl. 45.) They were made from river bowlders, pecked and rubbed to the desired shape. All have grooves around the central portion for the purpose of hafting the head to a handle. The groove is continuous, completely encircling the stone. The type is one which is found in comparative abundance in the late Basket Maker sites of the San Juan region.

The larger, heavier forms were probably used for driving pegs or posts and other similar duties. Only a few show signs of having been used in stone work, such as the quarrying of slabs for metates or for doorway covers. The smaller forms, like Plate 45, *c*, were probably club heads.

Maul sizes range from a length of $2\frac{7}{16}$ inches (6.2 cm.) to one of $7\frac{9}{16}$ inches (19.2 cm.); a breadth of $1\frac{9}{16}$ inches (4.1 cm.) to $5\frac{11}{16}$ inches (14.5 cm.); and a thickness of 1⅜ inches (3.5 cm.) to 3⅝ inches (9.2 cm.).

PICKS AND HOES

One of the most interesting of the implement groups in the stone series is that of the picks and hoes. (Pl. 46.) These objects were made from river bowlders, chiefly diorite, although some sandstone was used, preferably of the flat variety. They were worked only to a degree essential to their effectiveness. There was no additional polishing or shaping, no refinement of line or surface, utility being the sole consideration. Large chips or flakes were knocked off the natural stones to form the points and edges of the implements and rough notches were made in the sides to provide means for hafting. The hoes thus formed would be of considerable service in the tilling of the soil.

Picks would be very essential in the digging of pits for the houses and for obtaining the earth used in mixing the adobe mortar used so extensively in construction work. The form shown in Plate 46, *c*, no doubt was of decided usefulness in such labors. An implement of this type was probably extensively used in making the excavations which served as reservoirs and as the subterranean portions of the kivas.

The size range in this group is not very great. Lengths vary from 7⅝ inches (19.3 cm.) to $10\frac{1}{16}$ inches (25.5 cm.); widths from $3\frac{15}{16}$ inches (10.1 cm.) to 5 inches (12.7 cm.); and the thickness from 1⅝ to 2¼ inches (4.14 to 5.7 cm.).

AX HEADS

The ax heads from the Piedra are of interest because they represent the earliest known form in the Southwest. Thus far in the archeological investigations of the area no ax head has been obtained from a horizon preceding that of Pueblo I. The absence of this type of stone implement seems to be one of the characteristics of the earlier phases of the sedentary cultures. Although they first appeared in Pueblo I, ax heads were made in comparatively small numbers, judging from the few in collections representing that stage. The Piedra district indicates that it was even rather late in that period that they were developed. Not one example was found in a house of the A type. They came only from B and C sites. That such was the case may, of course, be only coincidence. In view of the large number of house-units investigated, however, such would not seem to be true. Mr. Morris found only a few in his La Plata work and they were from a village which corresponds to the B-house stage in the Piedra chronology.[21]

The ax heads are not of a highly efficient form, as the cutting edges, with a single exception, are very blunt. The only one which was definitely sharpened is of the double-bit variety. (Pl. 47, *c*.) Each end was ground down to a good cutting edge. It is of interest to note that in this group of tools the desired result was obtained not by chipping off large flakes, as in the case of the picks and hoes, but by grinding or rubbing with another stone.

None of the specimens has a groove running completely around the stone. The implements were notched, like the picks and hoes, for hafting. Specimen Plate 47, *b*, has an additional notch at the upper end. This would facilitate the fastening of the handle and make the lashings more secure. An ax of this same type was found in Nevada by M. R. Harrington[22] and occasional examples with the same form of end notch have come from other districts of the San Juan. All of the Piedra specimens were made from diorite.

The size range is not marked. The length varies from 5¾ inches (14.7 cm.) to $7\frac{13}{16}$ inches (19.8 cm.); the breadth from 2⅞ inches (7.4 cm.) to 4⅜ inches (11.1 cm.); and the thickness from 1⅜ to 1⅝ inches (3.5 to 4.1 cm.).

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[21] Morris, E. H., 1919 b, p. 201.

[22] Harrington, M. R., 1927 b, pl. XL, *a*.

PROBLEMATICAL OBJECTS

Two of the worked stones in the collection are of a form difficult to identify. One of them (pl. 48, *a*) consists of a more or less rectangular piece of stone which shows that a certain amount of rubbing was resorted to in shaping it for use. Furthermore, a shallow groove was pecked around one end, the upper in the photograph. This would suggest that some sort of lashing was used with it. The stone might have been used as a weight of some kind, but to what end can not be stated. The object more closely resembles a sandal last than any other artifact but varies considerably from the accepted forms of the latter. All that can be stated definitely is that the stone shows that it was prepared for a use which is problematical.

The second implement of questionable function is Plate 48, *b*. It consists of a long, narrow piece of shale, roughly rectangular in cross section, which was worked only at the ends. One of the latter was merely rounded, while the other was sharply beveled so that a good cutting edge was formed. The most likely use to which it could have been put was that of a chisel or end scraper. It would have been of considerable value in removing the grease and fat from skins and would have been of service in other kinds of work where such an edge was required. On the other hand, a Zuñi, Charlie Pinto, who has always proved reliable in his information, insists that it is a thunderstone of the type used in certain ceremonies in the kiva. The writer is more inclined to assign a mere utilitarian function to the object but believes that at best it can only be called problematical.

The first object (pl. 48, *a*) has a length of 10¼ inches (26 cm.), a breadth of 4 inches (10.2 cm.), and a thickness of 1⅜ inches (3.5 cm.). The second, the chisel-like form, is 17$\frac{11}{16}$ inches (45 cm.) long, 2⅛ inches (5.3 cm.) wide, and 1$\frac{5}{16}$ inches (3.4 cm.) thick.

STONE POT LIDS

Pot lids were not only made from clay, as described in a preceding section, but of stone as well. The stone lids from the Piedra are of the same general type found throughout the San Juan area. They are roughly circular in form (pl. 49), and were made from thin slabs of sandstone. On some of the specimens the edges were rubbed down while on others they were chipped. A few have well-smoothed tops and bottoms. The remainder apparently were left in about the condition in which they were flaked or split off from larger slabs. Such covers for jars and bowls would be of service but would not seal the contents in as efficient a way as the clay stoppers. They were quite extensively used, however, as many complete specimens as well as large numbers of broken pieces were found during the progress of the investigations.

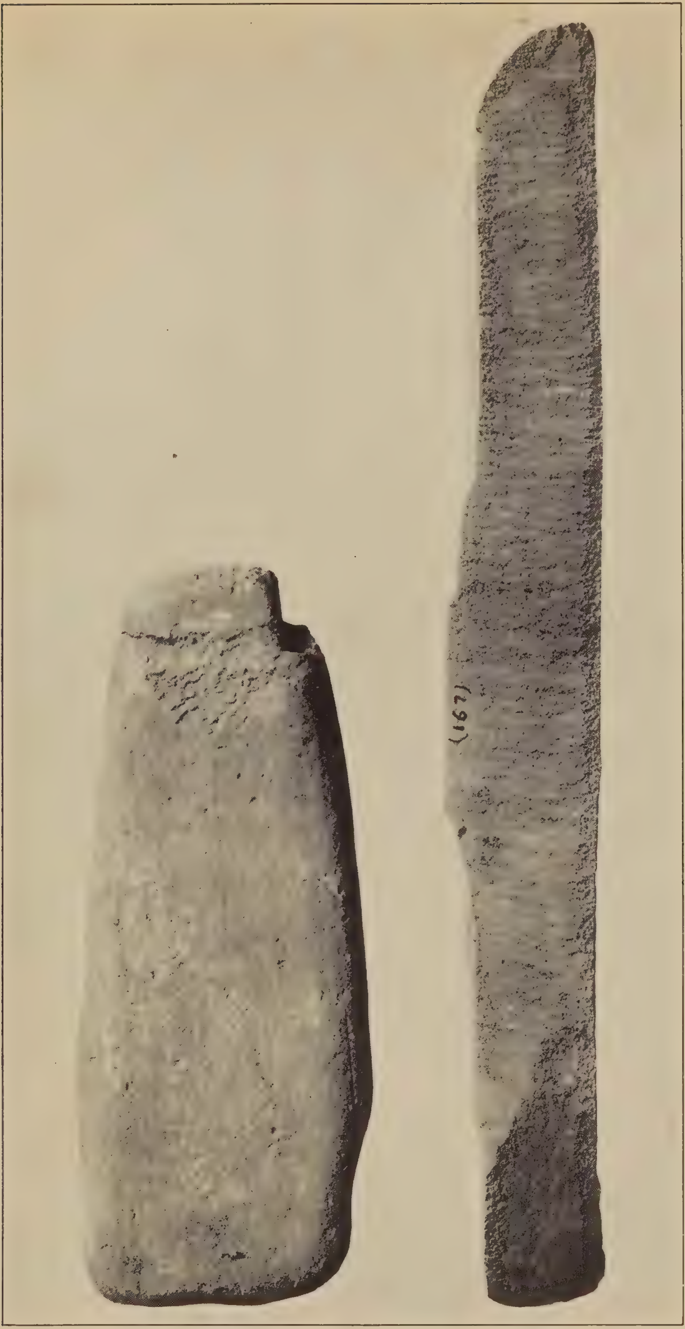
There is considerable variation in the size of the stone lids. Those for use on jars were the smallest and those for bowls the largest. The range in diameter is from 5¼ inches (13.4 cm.) to 1 foot (30.48 cm.). Only a few of the latter were found, however. Most of those used on bowls range between 7 and 8 inches (17.78 and 20.32 cm.). The thickness of the lids varies from one-fourth to three-eighths of an inch (6.4 mm. to 9.6 mm.).

CHIPPED IMPLEMENTS

Included in this group are the scrapers, knife blades, spearheads, and arrow points. Only three kinds of stone are represented in these implements; one kind was used in a single instance only. The favorite materials seem to have been chalcedony and obsidian, with little distinction between the two. Considering the implements as a group, a good quality of workmanship is exhibited. There is, of course, a certain amount of variation due to the difference in the skill of the makers. Such a condition is to be expected, however, as certain individuals were more adept in the art of flaking than others.

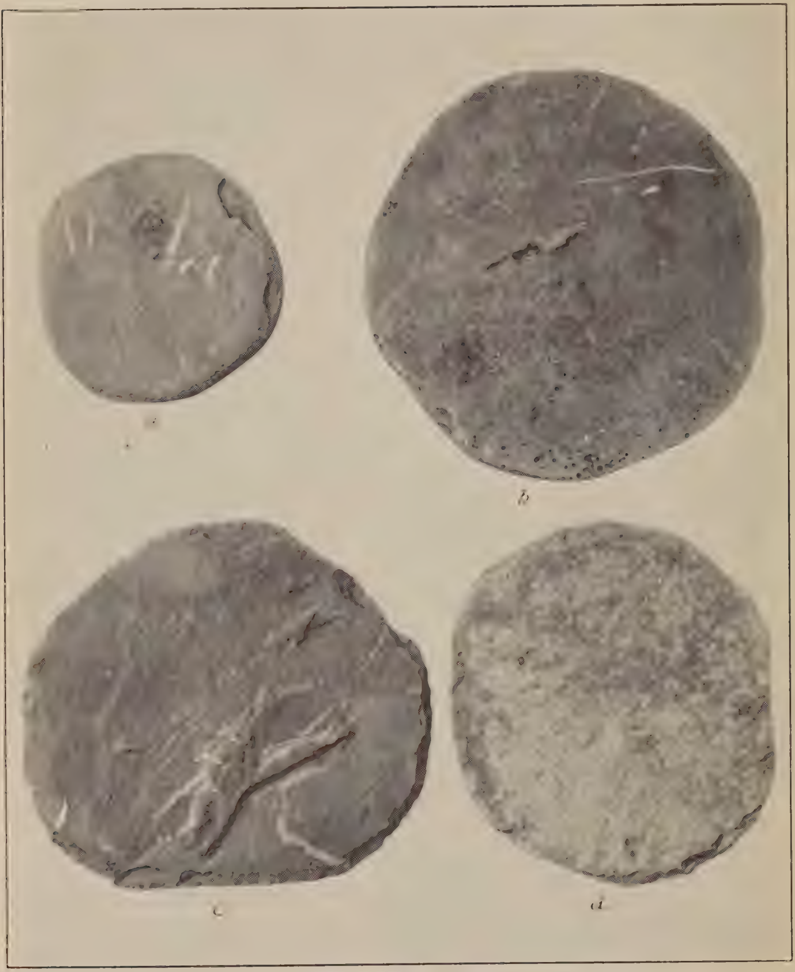
One of the characteristics of the Piedra sites was the scarcity of scrapers. Only a few were obtained. Most of them were well made, although not highly specialized, and would have been of considerable service to their owners. Three typical examples are illustrated in Plate 50, *a*, *b*, *c*. All were made from chalcedony flakes. The first one, *a*, might almost be classed as a knife blade, but it is more probable that it was a side-scraper. One edge was carefully flaked to a good cutting edge; the other was roughly chipped to the desired shape but was not well finished. The same is true of the other examples. The fine chipping and rough flaking occurs in somewhat different proportions and at different points on the implements but the general characteristics are the same.

Two examples of spearheads are illustrated in Plate 50, *d*, *f*. Shale was used in the manufacture of *d* and chalcedony in *f*. Although included in the group, *e* is more properly considered as a knife blade. This classification is based on the supposition that the same features hold true in the Pueblo I period as in the Basket Maker, where the main distinction between spearheads and notched knife blades is not one of size but of variation in the notches. Spear points have been found to have the notches set at right angles to the main or long line of the implement while on the knife blades they

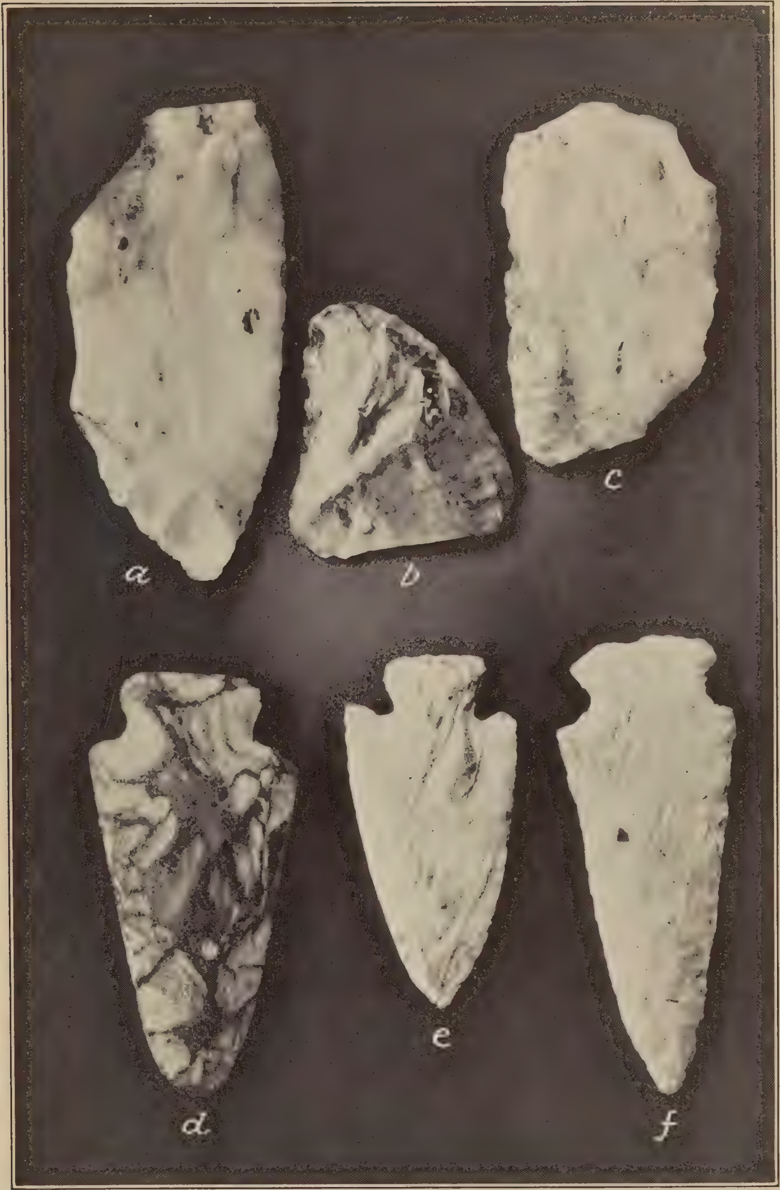


a *b*

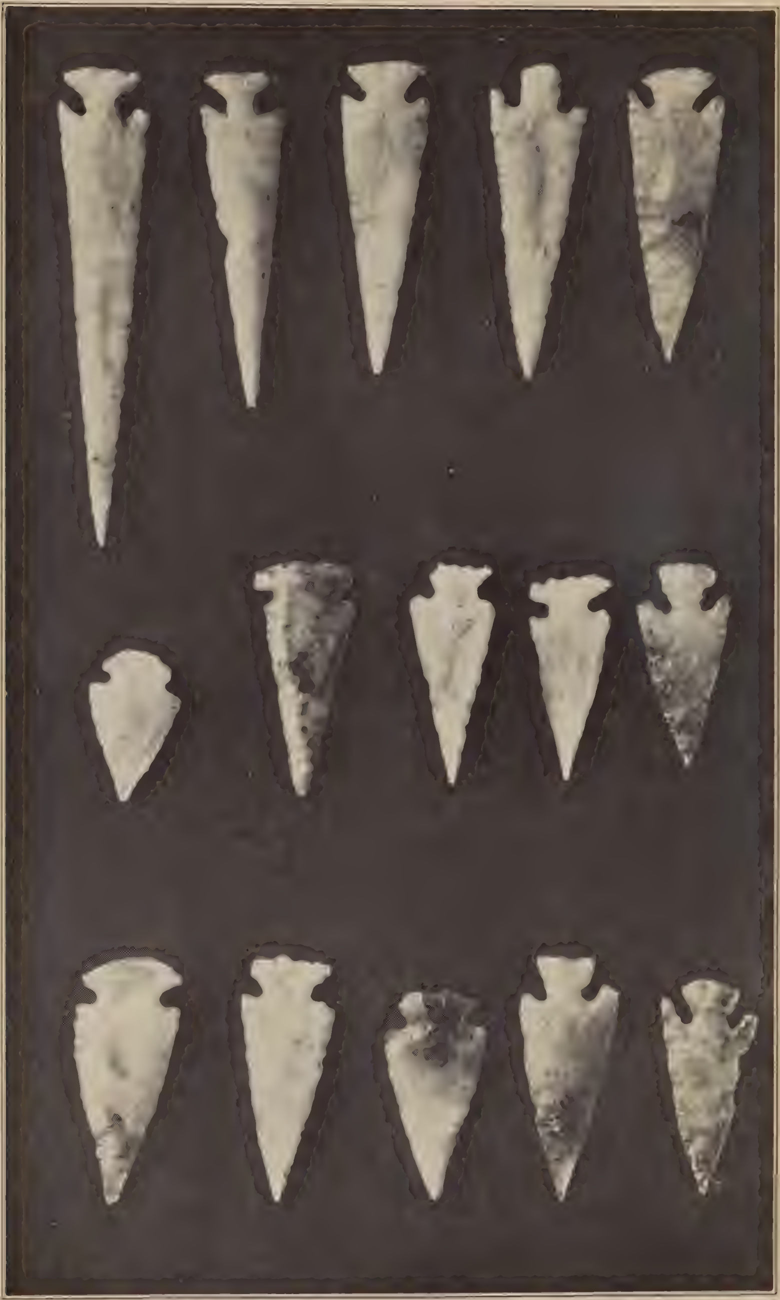
PROBLEMATICAL STONE OBJECTS



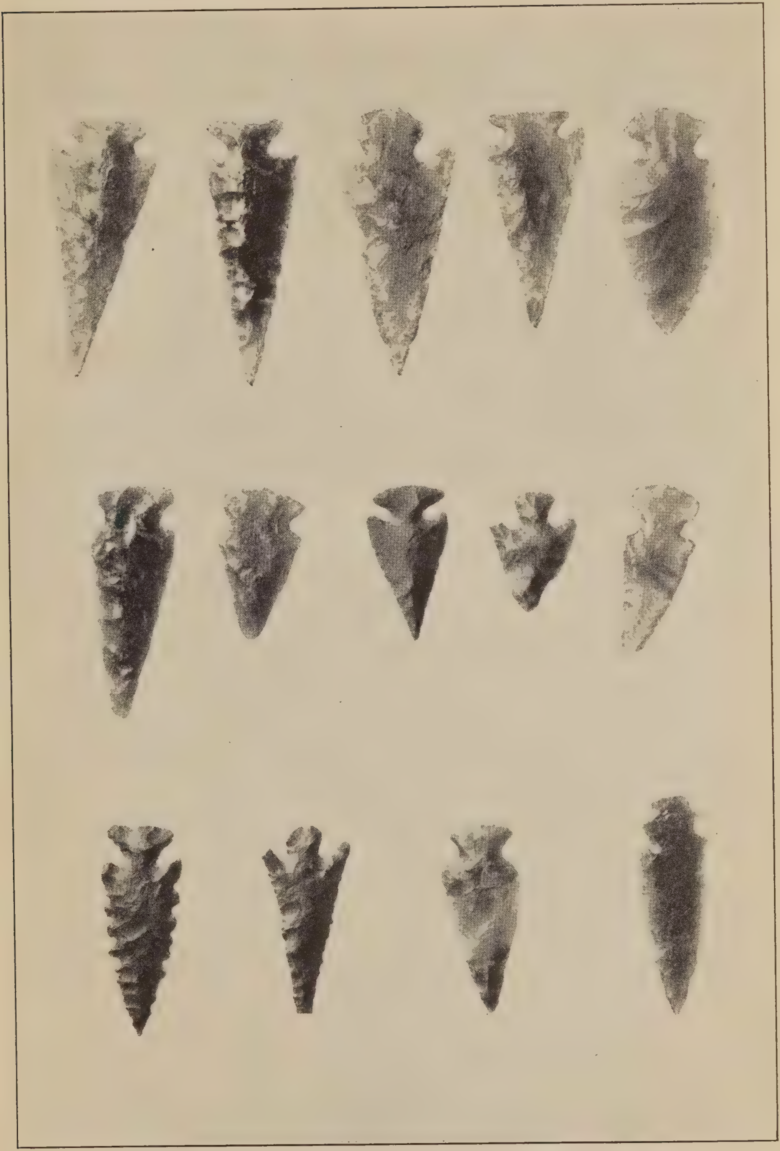
STONE POT LIDS



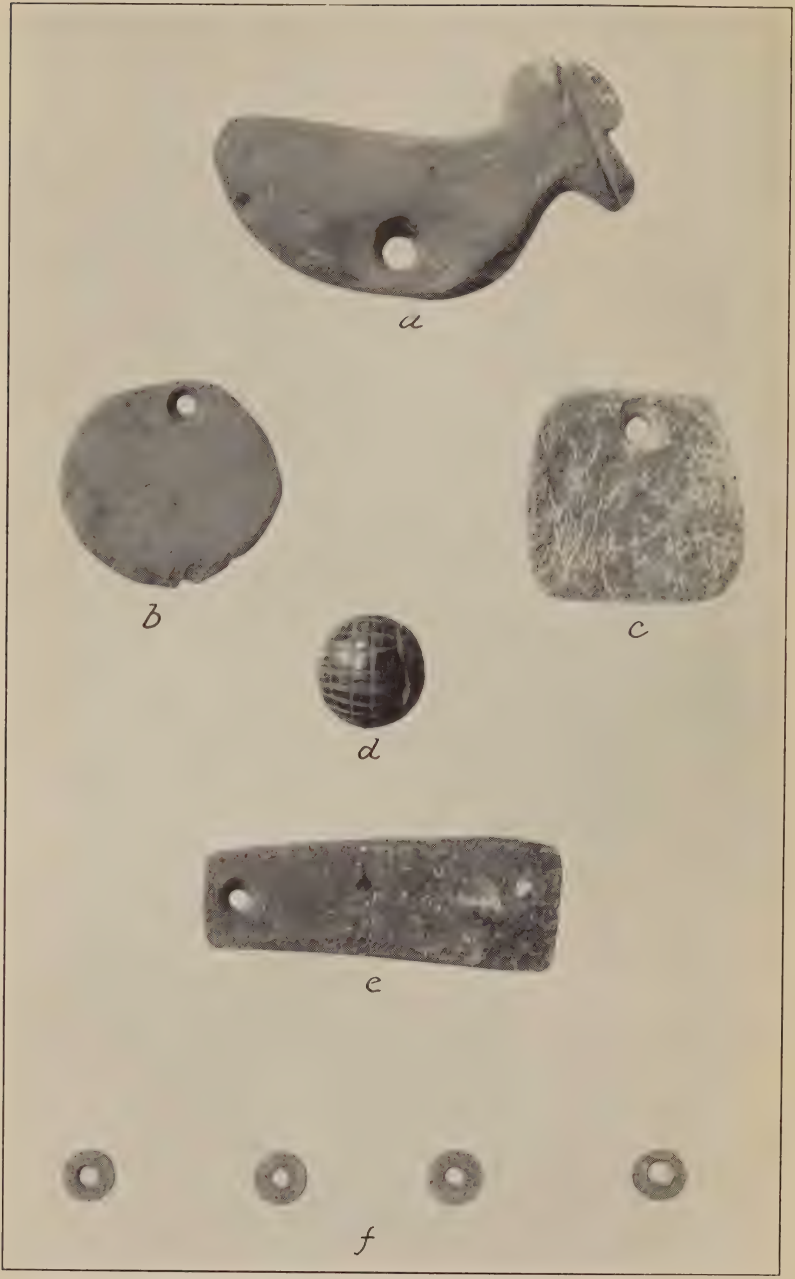
CHIPPED STONE IMPLEMENTS



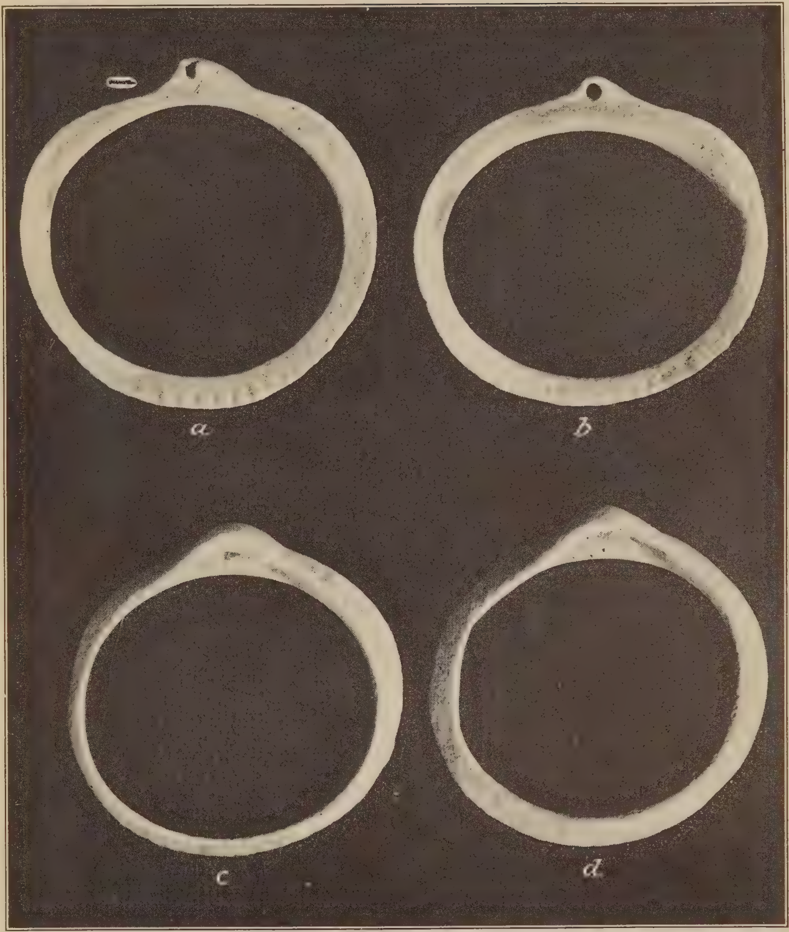
ARROWHEADS, LIGHT-COLORED CHALCEDONY



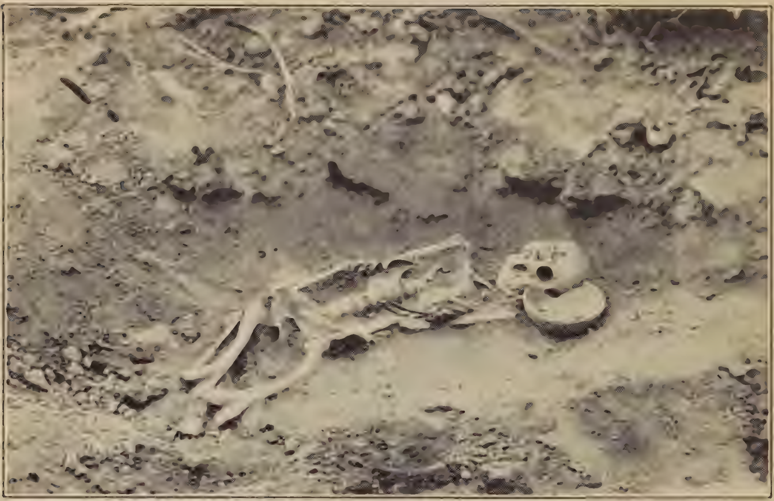
ARROWHEADS, OBSIDIAN AND DARK CHALCEDONY



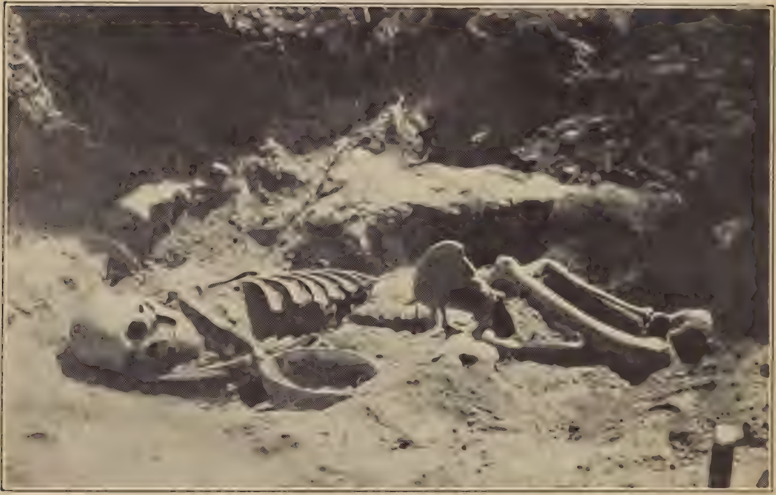
STONE PENDANTS AND BEADS



SHELL BRACELETS



a, Skeleton lying on left side



b, Skeleton lying on right side

HUMAN BURIALS

are at an acute angle.[23] The knife blade was made from a piece of pink-and-white chalcedony and is an unusually attractive specimen.

The arrowheads from the Piedra villages form an unusually fine group of specimens. The predominant form is one with a rather long, narrow blade; comparatively long, sharp barbs; and notches set at an acute angle to the long axis of the blade. (Pls. 51, 52.) Occasional specimens are found which have a rather short, broad blade and notches which are placed at right angles, but they are in the minority, forming about 35 per cent of the whole. This is in contrast to the preceding period, however, where the arrowheads are almost exclusively of the narrow-blade, acute-angle form of notch. In later stages the stubbier blade and right-angled notch becomes more and more numerous. The group illustrated in Plate 51 comprises the light-colored chalcedony points. Those in Plate 52 were made from dark chalcedony and obsidian.

PIPES

Tools, implements, and projectile points were not the only objects made from stone. Included in the list are the stone pipes mentioned in the discussion of the clay cloud blowers. One of the stone pipes (pl. 37, *h*) certainly was not made in the Piedra district. It is of steatite and unquestionably came from California, a fact which is of interest in that it shows very early trade relations between two areas. The other (pl. 37, *g*) might be a local product inasmuch as it was made from cave limestone. This material is not unknown in the region. It is rather unusual, however, to find cloud blowers or other objects made from it.

The stone pipes are not very large. The steatite one has a length of $3\frac{13}{16}$ inches (9.7 cm.) and a diameter of $1\frac{1}{16}$ inches (2.7 cm.). The other has the same diameter and a length of 2⅜ inches (6.1 cm.).

ORNAMENTS

Only a few ornaments were recovered and most of them were made from stone. The most favored material, judging from the number of fragments and whole specimens, was a ferruginous shale of brick-red hue. Pendants of various forms were made from it. The bird (pl. 53, *a*) is an unusual type, but the disk, *b*, is a characteristic form. Pieces from many broken pendants of this type were found, but the illustrated example is the only whole specimen. The pendant, *c*, is a hard greenish stone whose exact character can not be determined without destroying the ornament. The so-called southwestern form of alabaster furnished the material from which *e* was made.

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[23] Guernsey, S. J., and Kidder, A. V., 1921, p. 87, pl. 35.

The four flat beads were made from gray shale. The latter is very abundant in the region. For some reason or other beads were not plentiful. Even counting the broken ones, there were not enough in the number recovered to make two medium-length necklaces. Why there was a lack of such objects for personal adornment is not known. At most sites beads of one kind or another generally are quite abundant.

Turquoise was so rare that it might well be considered as nonexistent. Only two small pieces, presumably from an inlay or mosaic, were found. Both were lying on the surface of the ground and may well have come from a later horizon. No traces of this usually popular stone were present in an unquestioned relationship to the period represented.

OTHER OBJECTS OF STONE

There are many additional objects of stone in the collection. All are natural forms and probably fall into the group which is generally considered as fetishes. No definite purpose or function can be assigned to them. They are merely curiously shaped stones, bits of fossils, and crystals which possibly had some significance to their owners. They may have been considered as charms or possessed of magical properties of one kind or another. This group is not a chance assortment picked up around the diggings. All of the objects were found in bowls accompanying burials, a fact which is sufficient to indicate that they represent more than ordinary stones. Because of their indeterminate nature and the fact that any explanation offered would be largely conjectural, it has not been thought essential to illustrate the group.

Among the most significant of the unworked stone objects are the quartz crystals. Several were in mortuary bowls. The crystal plays a prominent part in certain phases of the ceremonial life of the modern Pueblos and the presence of so many in the Piedra collection suggests that it occupied an analogous position in the early periods. At Acoma the medicine men use a crystal in their diagnosis of disease. It is supposed to give them second sight, to enable them to locate objects in the patient's body, possibly even a witch who might be lurking about.[24] Among the Hopi the quartz crystal is regarded as a symbol of the sun and as such is attached to the serpent effigy which is used in certain ceremonies.[25] In some of the minor rites preceding the return of the Katcinas it is used to reflect a ray of sunlight through the kiva hatchway and onto the sun symbol on the altar, as well as to reflect sunlight into the medicine bowls.[26]

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[24] White, L. A., 1928, p. 564.

[25] Fewkes, J. W., 1920, p. 501.

[26] Fewkes, J. W., 1920, p. 517.

At Zuñi three crystals are placed on the altar of the Little Fire Fraternity.[27] It is possible, but of course the question is purely conjectural, that the above uses of the crystal may represent an ultimate development of features which had their beginnings at the very dawn of the Pueblo cultures; that in the specimens from the Piedra graves we have some of the earliest examples of the ceremonial quartz crystal.

Shell Ornaments

The only objects of shell obtained were in the form of four bracelets (pl. 54) which were on the left arm of one of the skeletons. This form of bracelet is very widespread in its distribution throughout the Southwest. It becomes more and more common toward the south and west, in fact usually is found in considerable numbers in sites throughout Arizona. Examples are only occasionally found as far north and east as the Piedra district.

The bracelets were made from glycymeris shell (*Glycymeris giganteus* Reeve, 1843), which is found in the waters of the Gulf of California from Magdalena Bay, Lower California, to Mazatlan, Mexico.[28] They are another example of trade relations. They may have been bartered several times and passed through a number of hands before reaching their ultimate owner, or they may have passed directly from an Indian of the Gulf of California region to the Piedra resident on whose skeletal remains they were found. Their exact story, unfortunately, can never be known. It would be entirely in keeping with Indian nature and with what is actually known of recent peoples to postulate that their owner obtained them while on a journey to the western ocean. On the other hand, it is just as possible that they passed from Indian to Indian until, after many exchanges, they finally reached southwestern Colorado.

HUMAN BURIALS

The early Pueblo peoples along the Piedra River interred their dead, in a great majority of cases, in the refuse mound of the house-group unit or of the village. Out of the 104 burials investigated only two were in other locations. One of these was on the edge of the bluff overlooking the river at the north side of an A unit on Stollsteimer Mesa and the other was beneath a large stone slab under the floor of house A in group 3 of the large village. There were certain features about the burials as a group which are of interest in so far as they show a common treatment, variations in the form of interment, or a lack of definite practice. In general it may be said that the body was placed in a contracted position, lying on the side, and accompanied by mortuary offerings of pottery, and occasionally stone and bone implements. The form of contraction observed was not so much that of the so-called natal position, the knees drawn up to the breast, as a folding of the legs. The lower limbs were drawn up tight against the upper ones, which extended at approximately right angles to the body line. Now and then the contraction of the lower limbs was not particularly marked, but in not one example were the thigh bones found in a position indicating that they had been drawn up against the body. In contrast to other sections, the skeletons were only occasionally covered with large stone slabs. The whole group showed the use of such slabs in only 5.8 per cent of the interments.

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[27] Stevenson, M. C., 1904, p. 551, pl. CXXVII.

[28] The shell was identified and information furnished by W. B. Marshall, assistant curator of mollusks, U. S. National Museum.

No great significance can be attached to the question of the orientation of bodies. If any one direction was more favored than the others in the placing of the head it was the north. Also, those interred with the head toward some other point of the compass in a fairly large number of cases had had the face turned in a northerly direction. This might be considered as suggesting that the north had a certain symbolical importance in the minds of the group. Some students of the region and of the mythology of the Pueblos hold that the north is a direction of great significance to that people because of their traditions of having originated and once lived there before migrating southward to the region they now occupy. If such was true in the Piedra settlements the importance could not have been particularly marked because of the number buried with the head and face toward other regions. The burials showed 33.7 per cent with the head toward the north, 21.1 per cent toward the east, 13.4 per cent toward the south, and 13.4 per cent toward the west; not determinable, 18.4 per cent. The latter were burials which had been disturbed by badgers or other burrowing animals, and for that reason the head direction could not be determined.

Of the group with heads placed in other directions 42.2 per cent had the face turned toward the north, in 30.7 per cent of cases it was toward the south, in 19.3 per cent the head faced the east, and in 7.8 per cent it was toward the west. The directions used in working out these percentages were not the absolute points of the compass, but the range from northwest to northeast stood for north, northeast to southeast for east, and so on.

The side on which the body was most frequently placed shows about the same variation as observed in the head orientation. The skeleton was lying on the left side in 41.7 per cent of the burials, on the right side in 33.7 per cent, on the face in 2.9 per cent, on the back in 2.9 per cent, and in 18.8 per cent the position could not be determined because of disturbance.

The total number of skeletons showed 17.3 per cent children, 32.7 per cent adult males, 34.4 per cent adult females, and 15.6 per cent adult remains which could not be sexed. The percentage of children seems rather small in comparison to that of the adults, but it is quite probable that the bones of many of the infants did not withstand the agents of decay as well as those of the older children and adults did. Infant mortality is usually quite high among peoples of lower cultures, and it would seem that there should be a larger proportion of such remains than actually was found. That the number is small is more likely due to the cause just mentioned than to a lower death rate among the infants in this particular group.

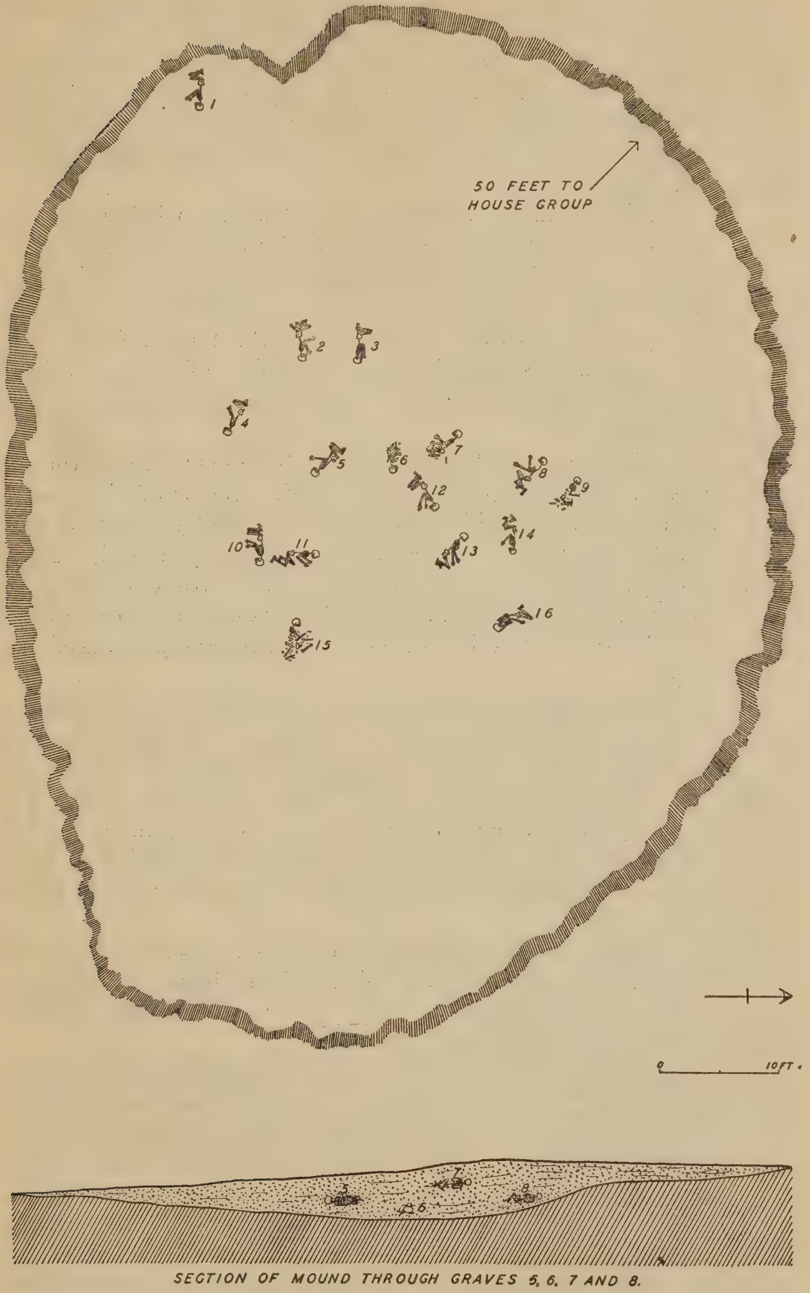
The skulls of all but six individuals exhibited the characteristic occipital deformation of the Pueblo peoples. The flattening did not occur as regularly on the back portion of the head as is the case in later periods, but was observed more frequently on one side or the other. Perhaps the cradling practice which produced such results was not fully perfected at this stage and as a consequence the flattening was not as well controlled. Another point which suggests itself, but one which can neither be proved nor disproved at the present time, is that possibly many of the inhabitants were of the old long-headed strain and because of a more pronounced occipital protuberance the head was more inclined to roll to one side than to lie flat, as would be the tendency with the rounder forms. If such was the case, that is a possible explanation for the side flattening. The displacement and modification caused by the deformation made it impossible to ascertain the original head form, however. Some of the skulls gave a distinct impression of being long-headed despite the deformation. The six undeformed crania were characteristically of the long, high crested form which superficially could not be distinguished from Basket Maker skulls. There unquestionably was a mixed group in these villages. The indications point strongly to an amalgamation of Pueblo and Basket Maker peoples. Not only is this suggested by the skeletal remains but, as shown in the discussion of pottery forms, by cultural features as well.

The combination burial and refuse mounds were so similar in their general characteristics and the interments as a whole were so typical that a detailed discussion of each is wholly unnecessary. So that the reader may have a clear understanding of the nature of the mounds and the position of the burials in them, however, one typical example will be considered. It was the refuse heap for one of the A house group units.

Before investigation there was little indication on the surface that any considerable amount of refuse had been placed there. As a matter of fact the edges of the deposit blended so imperceptibly with the surrounding ground level that the average person would have passed over it without noticing even the slight rise near the center. The top was somewhat darker in color than the natural earth, due to the ash content, and a few potsherds and stone flakes were scattered here and there. As soon as trenching activities were begun the reason for the apparent lack of depth in the mound was discovered. The refuse from the houses had been deposited in a small natural gully and most of the material was below the surrounding ground level. (Fig. 40.) The deposit may originally have risen above the ground level to a greater extent than noted at the time of the excavations and have been packed down or washed away by surface water, but even if it had not considerable refuse had been deposited there. By tracing out the edges, through the slight difference in earth color, it was found that the mound was slightly oval in shape with a north-south axis of 65 feet (19.812 m.) and an east-west of 87 feet (26.52 m.). The depth near the center, in the range of the gully bottom, was 4 feet 6 inches (1.3716 m.). The content of the mound was no different from that in any of the deposits mentioned in the discussion of the house-group units. It was chiefly sand, ashes, broken stones, bones, and potsherds.

The burials, with one exception, were clustered in the central portion of the mound. (Fig. 40.) This feature was found to hold true, in the main, in all of those examined. This can be explained on the basis that the dead were interred in the deepest part of the mound. There is no good explanation for the isolation of the burial No. 1 in Figure 40. Any number of reasons might be postulated to account for the exclusiveness of the particular individual, but none could tell, as far as we know, definitely why the body was so placed. The characteristics of the various interments may be briefly summarized.

No. 1, an adult male. Lying on the left side with the head toward the east, face to the south, 1 foot (30.48 cm.) below the surface. The lower limbs were drawn up against the upper, the femurs at approximately right angles to the body line. The arms were bent at the elbows, lying side by side in front of the body. At the head were two seed jars and a pitcher. One of the seed jars was black on red. It contained a large assortment of stone flakes, small fossils, bits of copper ore, a large spearhead, and a stone pipe. The collection suggests that of a medicine man. This may account for the isolation of the burial.


1
50 FEET TO
HOUSE GROUP
2
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8
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10
11
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10FT.
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7
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8
SECTION OF MOUND THROUGH GRAVES 5, 6, 7 AND 8.

FIGURE 40.—Distribution of burials in typical refuse mound

No. 2, an adult male. Buried 2 feet 6 inches (76.2 cm.) beneath the surface. Lying on the right side with the head to the east and face to the north. The legs were flexed, the left more tightly than the right. The right arm was bent close to the body, the hand almost touching the face, while the left was extended at approximately a right angle to the body line. No mortuary offerings accompanied the skeleton.

No. 3, an adult female. Buried 2 feet (60.96 cm.) below the surface. Lying on the right side, head to the east and face to the north. Lower limbs tightly flexed, femurs extended at right angles to the body. Both arms bent at the elbow and drawn against the body, the right hand beneath the face and the left in front of it. Bones in an advanced stage of decay. Mortuary offerings consisted of a small culinary vessel placed in front of the face and a bowl at the back of the head.

No. 4, an adult female. Skeleton 1 foot (30.48 cm.) below the top of the mound. Body had been covered with a layer of river bowlders. Lying on the left side with the head slightly south of east, face toward the south. Lower limbs moderately flexed. Arms slightly bent, lying side by side and extended in front of the body. Bones in a poor state of preservation. Five vessels had been placed in front of the knees—two bowls, one small culinary jar, a seed jar, and a pitcher.

No. 5, an adult male. Bones 18 inches (45.72 cm.) beneath the surface. An undeformed long head. Lying on the left side, head to the southeast. The legs were moderately flexed, the femurs extended at an angle of about 60° from the body line. The left arm was extended along the body, the hand lying under the left femur. The right arm was bent at the elbow and extended in front of the body. A mortuary bowl was placed just back of the pelvis or hips.

No. 6, an adult, probably female. Was 2 feet (60.96 cm.) below the surface. A disturbed burial, leg and body bones all piled together. Head was toward the east, face to the north. Accompanied by one bowl placed near the head.

No. 7, an adult male. Interred 1 foot 6 inches (45.72 cm.) beneath the surface. Lying on right side with the head to the northwest, facing the southwest. Leg bones had been disturbed but body and arms were articulated. The right arm was bent at right angles to the body, the left only slightly extended in front of the leg bones. No mortuary offerings accompanied the remains. The disturbance in this burial and that of No. 6 might be attributed to burial No. 12, which is in close proximity. If the latter had been interred after Nos. 6 and 7, the latter might have been disturbed by the gravediggers preparing the pit for No. 12. Indications strongly pointed to an earlier deposition for No. 12, however, so that there is no explanation for the condition of Nos. 6 and 7. There were no traces of badger burrows in that part of the cemetery and no indications on the surface that the mound had ever been dug into. It is, of course, possible that in prehistoric times some one may have dug into the graves, disturbed the bones, and then re-covered them, the time elapsing between that occurrence and the recent exhumation being sufficient to obliterate all traces of the earlier work.

No. 8, an adult male. Was buried 2 feet 6 inches (76.2 cm.) below the surface and was on the old ground level. Lying on the right side with the head toward the northwest, face to the southwest. Legs were flexed, but the left femur was drawn up to a greater extent than the right, so that the lower left leg rested on both the upper and lower right leg bones. The right arm was bent at the elbow so that the lower arm was extended in front of the body. The right was only slightly bent and the hand was just above the left knee. The skull was covered by a small stone slab, a pot lid, and a larger one was over the body portion of the skeleton. A single broken bowl placed in the space between the left knee and the pelvis and the left arm constituted the only mortuary accompaniment.

No. 9, an adolescent child. Buried 1 foot (30.48 cm.) beneath the surface. Lying on the left side with the head to the northwest, face to the north. A badger or similar burrowing animal had dug through the legs of the skeleton, disturbing the bones. The right arm was bent at the elbow and the forearm extended practically at a right angle to the body line. The left arm had been extended along the left side. No mortuary offerings accompanied the remains.

No. 10, an adult male. Interred 1 foot (30.48 cm.) below the surface. Skeleton was covered with river bowlders. Lying on left side with the head to the east, face to the south. Lower legs tightly flexed against femurs. Upper legs at right angles to the body line. Left arm bent at elbow and forearm extended at right angle to body. Right arm not flexed to so great an extent. Two bowls accompanied the burial. The smaller one was placed upside down inside the larger. Possibly contained food which was covered to protect it from the dirt. Both bowls were placed at the back of the head.

No. 11, an adult male. At a depth of 2 feet (60.96 cm.) beneath the surface. Was lying on the natural soil at the bottom of the refuse. On left side, head to the north, face to the east. Lower legs not as tightly drawn up as in most burials. Left femur was flexed so that the knee was drawn up, the right extended to form a right angle with the body. Arms bent at elbows, hands in front of thorax. Bones in an advanced stage of disintegration. Skull crushed by earth. Mortuary offerings consisted of a bowl, half of a nonculinary pitcher and a fragment from a culinary jar.

No. 12, an adult female. Skeleton 3 feet (91.44 cm.) below the surface. Stone slab over head and body. Remains lying on left side, head to the northeast, face to the southeast. Lower legs only moderately flexed. Femurs formed an obtuse angle with the body line. Arms bent at elbows, forearms forming acute angles with body line. Small culinary jar in front of face only mortuary offering.

No. 13, an adult female. Bones 1 foot (30.48 cm.) below the ground level. Lying on left side, head toward the northwest, face slightly east of north. Lower limbs loosely flexed. Femurs formed an obtuse angle with body line. Lower right leg bones crossed, lower left just above ankle. Arms slightly bent at elbows, left a little more than right. Bowl in front of face only offering.

No. 14, an adolescent child. Remains were 2 feet (60.96 cm.) below the surface. Lying on the left side, head toward the east and the face toward the south. Lower limbs moderately flexed. Right knee rested on left tibia and fibula. Left femur was at right angle to body line, right formed a slightly obtuse angle. Arms bent at the elbows, hands in front of the chest. Right arm lying on top of left completely covering it. Two mortuary bowls had been placed in the grave with the body. They did not occupy positions similar to those noted in the majority of cases. Instead of being at one side or near the head, they rested on top of the body.

No. 15, an adult female. Bones 1 foot 6 inches (45.72 cm.) below the surface. Lying on left side, head toward the west, face to the north. From just below the scaphoid bones, the shoulder blades, the skeleton was so disturbed as to make it impossible to tell the positions of the legs and arms. Pelvic bones and skull clearly indicated the sex. Grave furniture consisted of two bowls and a seed jar placed near the top of the head.

No. 16, an adult male. Lying 2 feet (60.96 cm.) below top of mound. Covered with a worked slab of stone, possibly a door. Remains lying on right side, head to the southeast, face to the northeast. Lower legs tightly flexed against femurs. Latter extended from pelvis at an obtuse angle. Back curved to a certain extent. Left arm sharply bent at elbow and hand placed under face. Right arm only slightly bent, forearm approximately paralleling upper leg bones. Skull was of the undeformed, long-headed type. Skeleton was practically surrounded by mortuary offerings. Eighteen vessels—bowls, jars, pitchers, culinary pots. Several small jars contained pigment, one red ocher, another yellow ocher, a third pellets of azurite, and a fourth finely powdered charcoal. The individual was certainly an important member of the community, judging by the possessions which accompanied him.

Out of the group of 16 burials in this particular mound 7, or 43.75 per cent, were males; 6, or 37.5 per cent, were females; 2, or 12.5 per cent, were children; and 1, or 6.25 per cent, indefinite as to sex but probably a female skeleton. The figures run somewhat higher as to percentage of males and females and lower in the number of children and indeterminate remains for this mound than in the group as a whole. This is probably due to the fact that there had been less disturbance by animals with a consequent better preservation of the bones than was found in some of those investigated. Hence, it was not as difficult to determine the sex of the skeleton, the position of interment, and other features associated with it.

There were only two additional burials which warrant a more detailed consideration than was included in the general discussion. One of these was in a refuse mound accompanying a typical A unit east of the main village. It consisted of two male crania and a few cervical vertebrae only. The skulls rested on their bases in a small circular pit dug in the hardpan beneath the actual refuse. There were no traces of the rest of the bodies. As a matter of fact, the pit was not large enough to have contained a single body. The skulls were surrounded by four bowls, the latter filling all of the space between the crania and the walls of the pit. The burial was unquestionably that of heads only. An enticing field for the play of the imagination is opened by such a find, but the requirements of the present paper exclude its exploration. Why the heads of two individuals were removed and interred without the remainder of the bodies is not known. There are no grounds for believing that the people who inhabited the region could in any sense be considered head-hunters. There was nothing which might be interpreted as evidence of sacrificial rites. It is possible that they may have been the heads of men who had fallen in conflict or who had died while away on the hunt. Because of the difficulty of transportation, it was not feasible to carry the remains to home hearths for burial, so the heads were removed, taken back, and properly interred. This practice is not unknown among aboriginal peoples and may occasionally have been resorted to in this region.

The careful burial of portions of the human body has been found in other localities as well. Mr. Morris uncovered what he termed "The Burial of the Hands" in a late Basket Maker cist in a cave in Canyon del Muerto in northeastern Arizona. There he found side by side on a bed of grass, palms upward, the ligament-bound hands and forearms of an adult. They had been severed at the elbows. Indisputable evidence showed that this burial was complete, that the remainder of the body had never been included in the interment. The funerary offerings accompanying the hands were unusually rich, indicating some special significance. Any explanations for this find, as well as that of the Stollsteimer skulls, would probably fall far short, as Mr. Morris so aptly observed, of the truth of the mystery which lies behind it.[29]

The other burial of special interest was an isolated one on the edge of the bluff, overlooking the river, at the north side of an A unit at the northern end of Stollsteimer Mesa. The interment was called the Arrowmaker Burial because of the 22 fine arrow points, the quantity of stone flakes, the core from which they had been struck, and the bone-flaking tools which were found beside the skeleton. In addition to the points and the chipping material the grave contained 21 pottery objects, including the seed jar with head and wings (pl. 21, *b*) and the black-on-red " feather jar " (pl. 33, *b*), quantities of red ocher, and a pallet for the mixing of paint. The importance of the individual was still further emphasized by the fact that bones of a golden eagle (*Aquila chrysaëtos*) were by his side.

This unquestionably was the sepulchre of an outstanding member of the community. The body had been placed on the right side, the legs contracted, with the head to the east and the face toward the north. Possibly there was the thought that he could forever gaze in solitude upon the waters of the stream. That he was a master craftsman is shown by the fineness of the arrow points (pl. 51, upper row) which accompanied him on his last journey.

GENERAL SUMMARY AND CONCLUSIONS

Scattered along the lower branches and bluffs above the Piedra River in southwestern Colorado are the remains of many villages belonging to the earliest prehistoric Pueblo periods. The sites were first discovered by the writer during the summer of 1923 when he was conducting an archeological reconnaissance for the State Historical and Natural History Society of Colorado, but an opportunity for an intensive investigation of them did not present itself until the 1928 field season. During the months of June, July, and August of that year several of these one-time communities were excavated and much valuable data on house types, as well as many specimens of the lesser objects of the material culture of the people, were obtained. The investigations were almost wholly restricted to sites lying on the upper levels of Stollsteimer Mesa. The only exception was a small village on the first bench above the river at the foot of the southern end of the mesa. Evidence from the ruins of 80 houses, 2 kivas, 6 circular depressions, and 7 burial mounds makes possible quite definite conclusions regarding the forms of dwellings; pottery, bone and stone industries; and the general cultural status of the people.

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[29] Morris, E. H., 1925, p. 291.

There are three kinds of houses, which for convenience were designated A, B, and C. All belonged to the general type which is called jacal, had flat roofs with smoke holes near the center, lateral doorways, and were grouped around the pit from which the earth used in their construction was taken. Each house group and pit combination was considered as a unit, possibly the home of a single family group or clan. These units are thought to represent the prototype of the unit houses of the Pueblo II period.

The A houses were characterized by a quadrilateral but rarely rectangular form, sloping side walls, and interior support posts for the superstructure. The B dwellings were more nearly rectangular, the walls were perpendicular, the main supporting posts were incorporated in them, and the superstructure was completely incased in adobe mortar. The latter was in contrast to the A forms where the plaster was applied to the exterior only. Houses of the C class were closely related to those of the B form. Their characteristic difference was in the absence of the depressed floor or pit and their association and combination with small two-room structures of horizontally laid masonry which are thought to have been granaries.

The house forms were found to have developed in the order in which they are named. The evidence for such a conclusion includes an actual stratigraphic relationship between certain A and C remains in which the latter rested upon the former, a fact which definitely shows their subsequent construction. That the B class occupied the intermediate position was demonstrated by their association with the A forms and their close relationship to the C in structural characteristics. This was augmented by the finding of objects in the B dwellings which are typical of A and of C. Pottery peculiar to the A class was secured from B houses, while a ceramic form, the corrugated culinary ware, characteristic of C, was missing from both A and B, although one type of implement, the ax head, was found in both B and C but not in A.

The A houses are thought to show a late Basket Maker inheritance in their sloping walls, flat roofs, and interior support posts, but their general features are considered characteristic of a later horizon. The B and C classes have little in common with the dwellings of the preceding culture and may be said to illustrate definite Pueblo forms of the early period.

The outstanding constructional development of the period was that of the rectangular, perpendicular walled building, a thing which made possible the joining of single-roomed houses into a compact communal dwelling of many contiguous rooms, one of the typical features of the true Pueblo cultural complex.

The three house forms of the early Pueblo period in the Piedra district show some general similarities to types in other regions. The A dwellings seem to have no close counterparts, although it is quite possible that analogous structures were erected in the Muddy River Valley in southeastern Nevada. The B dwellings have their counterparts in the Pine River Valley and both the B and C forms are to be found in abundance in the La Plata district of southwestern Colorado. A form of structure comparable to the stone portions of the C units is to be found in Nevada. From the comparisons made it would appear that the jacal houses described in this report represent an early Pueblo phase which is typical of the northeastern San Juan area, but which in general show only superficial likeness to known buildings of that cultural horizon in other subareas. Future work in the inconspicuous low mounds covering house remains of the Pueblo I stage, however, may bring more examples to light. The unspectacular nature of the ruins of communities of this type has been largely responsible for the lack of investigations in them and thus far there is very little information available concerning the characteristics of the houses.

The circular depressions associated with the house-group units are no doubt the remains of the pits from which was taken the earth needed in mixing the mud plaster for the dwellings. The pits served secondary purposes, however, and it was ascertained that they had ultimately been used as reservoirs, as the subterranean portions of kivas and possibly, from information obtained by a previous expedition, as dance plazas.

Ruins of only two kivas were uncovered. This is an unusually small number of specialized ceremonial rooms for so large a number of house-group units but is a feature comparable to that found in communities of the same period in the La Plata district farther west. This lack of kivas is not believed to indicate that the Piedra settlements were temporary habitations or farming centers, but rather as showing that the circular ceremonial chamber was still in a developmental stage, that it has not yet become an integral part of the Pueblo cultures. Prehistoric Pueblo kivas of the San Juan area have many features which are also characteristic of the late Basket Maker dwellings which would suggest a decided influence extending over from the earlier phase to the religious practices of the later peoples. The influence was such, however, that it probably did not assert itself immediately in the Pueblo I period. When the older ceremonies began to be revived, after conditions became more stabilized, there was such a difference between the type of dwelling then in use and that which had been the scene of the simple family ceremonies in the older horizon that it was deemed essential to construct chambers embodying the main elements of the older domiciles. To simplify building problems, however, only one such structure was erected for the entire family group and the idea of the clan kiva developed.

Due to the conditions resulting from the commingling of older and newer peoples, it is quite possible that some of the units contained more Basket Maker members, hence, made provisions for a ceremonial chamber, while others, predominantly Puebloan, did not. It was only as the various elements fused to form a new and characteristic culture that the entire group was permeated with old, surviving beliefs and each clan constructed and maintained its own ceremonial chamber. Under such circumstances house-group units without kivas might well be expected during this early stage.

The lesser objects of the material culture of the people are represented only by specimens made from imperishable materials. All that remains upon which an appreciation of their arts and industries can be based are the pottery objects, bone and stone implements, articles of personal adornment made from stone and shell, and small fossils and curiously shaped stones which were collected and saved, possibly for ritualistic or ceremonial purposes.

The pottery shows clearly that the ceramic industry was in a transitional stage. Many features of the late Basket Maker period survived while new ones, which were to become characteristic of the Pueblo wares, appeared. Among the most significant of the new developments were: The banding on the necks of the culinary vessels; the shift from the banded to coiled pottery; variations in vessel shapes; the discovery of the slip or wash of "liquid" clay; the elaboration of painted decoration and the turning to new sources for design elements; the extending of painted decoration to the surfaces of large jars, pitchers, seed jars, and other vessel forms besides bowls and ladles. The designs on pottery containers are characterized by a boldness of conception with a marked lack of skill in their execution. The decorator was in no way hampered by convention or bound by long-established styles, but was free to follow the dictates of fancy, although the results show that the medium was still unmastered.

Bone and stone implements were not abundant and consist of only a few general forms. Awls, punches, knife handles, an occasional bead or whistle, and gaming pieces constitute the main objects fashioned from bone. Stone was used in the manufacture of milling stones, cutting edges, hammers, projectile points, and ornaments. The projectile points, especially the arrowheads, show that considerable skill had been developed in the art of stone chipping.

The only shell was found in four bracelets fashioned from glycymeris. The latter could have come only from the Gulf of California and represents early trade relations between that area and the southwestern Colorado peoples.

Burial customs were found to be quite similar to those practiced throughout the San Juan area. The cemeteries were in the refuse mounds of the house-group units or of the villages. In practically all cases the body was interred in a contracted position and with few exceptions was accompanied by mortuary offerings of pottery. No great importance can be attached to the orientation of bodies in the grave, as the heads were found directed to practically all points of the compass. The north was somewhat more favored than the other directions, and it is possible that a factor of some symbolical significance was attached to that quarter, although it could not have been of outstanding importance.

The refuse mounds did not occupy any definite position with respect to the village or house-group unit, as in later periods, but were located at the most convenient spot regardless of whether it was at the north, south, east, or west side of the community. Sometimes a mound was found within the village boundaries. In character, the refuse which comprised them was the same as that found throughout the Southwest.

The writer believes that the data from the Piedra investigations give a clear and distinct picture of the life of the people of the Pueblo I period in that portion of the San Juan archeological area. There is clear evidence in the wholesale destruction of villages by fire that the stage was one of disturbance and instability. That there was a mixing of peoples is shown by the skeletal remains. The transition from late Basket Maker to Pueblo cultural features is demonstrated by changing house forms, the amplification and development of the ceramic industry, the appearance of new types of stone implements and an improvement in the technique of manufacture of some of the latter. Although constituting a distinct horizon, which substantiates the general consensus of opinion among qualified students with respect to the chronological cultural periods in the development of southwestern sedentary peoples, the remains evidence survivals from the older culture at the same time that they present prototypes for the typical features of ensuing stages. The material culture shows that it was the result of a taking over and adapting of already established factors, to which new ones were added. As time went on some things were changed and others completely discarded. This, together with the two forms of crania in the skeletal material, indicates that there was no sharp break, although there is a distinguishable difference between the old and new cultures, and that the Basket Makers were to some extent, in the Piedra district at least, absorbed by the newer peoples not entirely blotted out or driven into other sections.

That the Piedra villages properly belong in the Pueblo I period is shown by certain outstanding features which have been agreed upon by the majority of southwestern archeologists as characteristic. Among them are the banded-neck culinary vessels; the change in house types in which the crude one-room domiciles gave way to structures with several contiguous rectangular rooms; the beginnings of true masonry; and the occipital deformation of the human head.

TABLE 1.—MEASUREMENTS OF STRUCTURES EXCAVATED

[A–1–A refers to class A, Group 1, house A, etc.]

House	Wall measurements												Depth of pit		
	East			South			West			North					
	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters
A–1–A	14	0	4.2672	16	5	5.0038	15	0	4.572	15	0	4.572	1	0	0.3048
A–1–B	7	5	2.2606	10	0	3.048	10	5	3.175	10	5	3.175	1	0	.3048
A–1–C	6	0	1.8288	10	0	3.048	6	9½	2.0701	9	3½	2.8321	1	6	.4572
A–1–D	6	0	1.8288	10	5	3.175	6	0	1.8288	14	0	4.2672	1	0	.3048
A–1–E	6	0	1.8288	8	0	2.4384	3	5	1.0414	6	5	1.9558	0	6	.1524
A–1–F	6	0	1.8288	12	0	3.6576	6	0	1.8288	5	10	1.778	0	6	.1524
A–2–A	12	0	3.6576	12	0	3.6576	8	0	2.4384	11	3½	3.4417	0	8	.2032
A–2–B	12	0	3.6576	7	5	2.2606	9	9½	2.9845	8	5	2.5654	1	0	.3048
A–2–C	16	0	4.8768	8	0	2.4384	17	0	5.1816	9	0	2.7432	0	6	.1524
A–2–D	14	0	4.2672	9	0	2.7432	16	0	4.8768	6	0	1.8288	0	4	.1016
A–2–E	11	0	3.3528	11	0	3.3528	9	0	2.7432	10	0	3.048	0	6	.1524
A–2–F	8	5	2.5654	9	5	2.8702	6	0	1.8288	6	9½	2.0701	0	10	.254
A–2–G	13	0	3.9624	8	5	2.5654	15	0	4.572	9	0	2.7432	1	0	.3048
A–2–H	13	0	3.9624	0	0	0.0000	12	0	3.6576	21	5	6.5278	0	0	.0000
A–2–I	13	0	3.9624	18	6	5.6388	14	0	4.2672	19	0	5.7912	1	0	.3048
A–2–J	11	0	3.3528	18	6	5.6388	12	0	3.6576	19	10	6.0542	0	9	.2286
A–2–K	10	0	3.048	0	0	0.0000	10	0	3.048	20	0	6.096	0	0	.0000
A–3–A	12	0	3.6576	8	0	2.4384	13	0	3.9624	6	5	1.9558	0	6	.1524
A–3–B	14	0	4.2672	9	0	2.7432	14	0	4.2672	8	7	2.6162	0	8	.2032
A–3–C	16	0	4.8768	11	0	3.3528	14	0	4.2672	8	6	2.5908	0	10	.254
A–3–D	19	5	5.9182	10	0	3.048	17	0	5.1816	9	0	2.7432	0	6	.1524
A–4–A	9	3	2.8194	27	0	8.2296	9	7	2.921	28	0	8.5344	1	6	.4572
A–4–B	6	0	1.8288	20	5	6.223	10	0	3.048	19	5	5.9182	2	0	.6096
A–5–A	9	0	2.7432	10	0	3.048	9	0	2.7432	11	0	3.3528	1	6	.4572
A–5–B	10	0	3.048	11	0	3.3528	10	0	3.048	12	0	3.6576	1	6	.4572
A–5–C	10	0	3.048	20	0	6.096	8	0	2.4384	21	0	6.4008	1	0	.3048
A–5–D	15	0	4.572	8	0	2.4384	14	6	4.4196	7	3	2.2098	0	10	.254

TABLE 1.—MEASUREMENTS OF STRUCTURES EXCAVATED—Continued

House	Wall measurements												Depth of pit		
	East			South			West			North					
	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters	Feet	Inches	Meters
A-5-E	29	0	8. 8392	8	0	2. 4384	31	6	9. 5612	10	0	3. 048	1	0	0. 3048
E-1	10	0	3. 048	9	0	2. 7432	11	7	3. 5306	10	0	3. 048	1	0	. 3048
E-2	9	7	2. 921	8	7	2. 6162	10	7	3. 2258	9	0	2. 7432	1	0	. 3048
E-3	9	5	2. 8702	8	0	2. 4384	9	4	2. 8448	8	7	2. 6162	1	0	. 3048
A-5-F	22	9½	6. 9469	8	9	2. 667	22	0	6. 7056	7	0	2. 1336	1	6	. 4572
A-6-A	8	0	2. 4384	18	0	5. 4864	9	0	2. 7432	18	0	5. 4864	0	6	. 1524
A-6-B	10	0	3. 048	9	7	2. 921	8	0	2. 4384	8	0	2. 4384	0	6	. 1524
A-6-C	11	7	3. 5306	8	7	2. 6162	11	9½	3. 5941	9	3	2. 8194	1	0	. 3048
A-6-D	9	5	2. 8702	7	4	2. 2352	5	7	1. 7018	8	0	2. 4384	1	0	. 3048
B-1-A	9	6	2. 8956	15	0	4. 572	9	6	2. 8956	14	6	4. 4196	0	6	. 1524
B-1-B	20	0	6. 096	15	6	4. 7244	21	0	6. 4008	15	4	4. 6736	0	6	. 1524
B-1-B[1]	3	6	1. 0668	5	6	1. 6764	3	5	1. 0414	5	7	1. 0922	0	6	. 1524
B-1-C	11	0	3. 3528	11	0	3. 3528	11	4	3. 4544	10	6	3. 2004	0	4	. 1016
B-1-D	9	0	2. 7432	12	6	3. 81	10	0	3. 048	12	0	3. 6576	1	0	. 3048
B-1-E	20	0	6. 096	12	6	3. 81	21	6	6. 5532	12	6	3. 81	1	0	. 3048
B-1-F	15	0	4. 572	12	0	3. 6576	15	6	4. 7244	12	0	3. 6576	1	6	. 4572
B-1-G	16	0	4. 8768	11	0	3. 3528	17	0	5. 1816	10	0	3. 048	1	6	. 4572
B-1-H	15	6	4. 7244	9	6	2. 8956	16	6	5. 0292	9	4	2. 8448	1	0	. 3048
B-1-I	9	10	2. 9972	24	0	7. 3152	11	0	3. 3528	24	0	7. 3152	1	0	. 3048
B-1-J	12	0	3. 6576	15	0	4. 572	15	0	4. 572	13	0	3. 9624	1	6	. 4572
B-1-K	9	0	2. 7432	8	6	2. 5908	11	6	3. 5052	7	0	2. 1336	1	6	. 4572
B-1-L	13	8	4. 1656	32	0	9. 7536	14	0	4. 2672	31	9	9. 6374	1	6	. 4572
B-1-M	20	6	6. 2484	11	8	3. 556	21	0	6. 4008	11	6	3. 5052	1	8	. 508
B-1-N	11	4	3. 4544	7	6	2. 286	11	5	3. 4798	7	4	2. 2352	1	0	. 3048
C-1-A	7	0	2. 1336	14	6	4. 4196	6	9½	2. 0701	14	0	4. 2672	0	0	--------
C-1-B	6	9½	2. 0701	6	0	1. 8288	7	0	2. 1336	7	6	2. 286	0	0	--------
C-1-C	7	0	2. 1336	7	0	2. 1336	7	6	2. 286	6	6	1. 9812	0	0	--------
C-2-A	12	0	3. 6576	20	0	6. 096	11	10	3. 6068	19	6	5. 9436	0	0	--------
C-2-B	16	7	5. 0546	8	6	2. 5908	16	3½	4. 9657	10	6	3. 2004	0	0	--------
C-2-C	6	0	1. 8288	6	6	1. 9812	6	3½	1. 9177	6	6	1. 9812	0	0	--------
C-2-D	5	6	1. 6764	6	0	1. 8288	5	6	1. 6764	6	0	1. 8288	0	0	--------
C-3-A	15	6	4. 7244	14	0	4. 2672	19	6	5. 9436	11	0	3. 3528	0	6	. 1524
C-3-B	6	6	1. 9812	7	6	2. 286	6	6	1. 9812	8	0	2. 4384	0	0	--------
C-3-C	5	0	1. 524	8	6	2. 5908	5	6	1. 6764	7	4	2. 2352	0	0	--------
C-3-D	15	6	4. 7244	10	0	3. 048	14	6	4. 4196	10	3	3. 1242	0	0	--------
C-3-E	6	6	1. 9812	8	4	2. 54	7	0	2. 1336	7	0	2. 1336	0	0	--------
C-3-F	8	8	2. 6416	14	2½	4. 3317	9	7	2. 921	14	4	4. 3688	0	0	--------

TABLE 2.—NUMBER, SIZE, AND PROVENIENCE OF OBJECTS ILLUSTRATED

POTTERY

Illustration	Size				Provenience	Field No.	National Museum No.
	Height		Diameter				
	Inches	Centimeters	Inches	Centimeters			
Fig. 15, a	13½	34.3	11⅛	28.3	B Village, house B	A-13	348402
b	15¼	38.7	12 7/16	31.6	A-2-J	80	348246
c	8 1/16	20.5	7 13/16	19.9	Burial 1	6	348155
d	7 23/32	19.6	8 1/16	20.5	Burial 2-B-14	188	348390
e	6 5/16	16.0	5¼	13.3	Burial C-7	245	348463
f	4 15/16	12.6	5⅛	13.0	Burial A-1	116	348333
g	7½	19.1	5 15/16	15.1	Burial C-10	235	348485
h	4½	11.45	4 1/16	10.3	A-5-E	102	348313
i	9	22.86	12½	31.75	do	101	348312
Fig. 16, a	20½	52.1	14¼	36.2	A-1-B	50	348206
b	17⅜	44.2	12 1/16	30.7	A-2-I	82	348232
c	15¾	40.0	13⅜	34.0	A-5-E	100	348311
d	15 9/16	39.5	13⅞	35.3	A-2-I	79	348230
Fig. 17, a	3½	8.8	5	12.7	B-1-M	A-19	348419
b	3 9/16	9.0	5⅛	13.0	A-5-E	129	348308
c	5⅜	13.7	7⅛	18.0	Burial C-8	215	348471
d	4⅛	10.4	7¼	18.4	do	212	348465
e	4⅝	11.8	7⅞	20.0	Burial 2-B-1	190	348369
f	3 5/16	8.4	6 11/16	16.9	A-5-E	119	348320
g	5 5/16	13.5	4 13/16	12.2	do	121	348322
h	9⅝	23.4	12¼	31.1	A-4-A	270	348273
i	8¼	21.0	11⅝	29.5	A-2-J	70	348240
Fig. 18, a	12 1/16	30.6	9 7/16	24.0	B-1-A	A-2	348394
b	10	25.4	8 9/16	21.8	A-4-A	271	348274
c	9¼	23.4	8¾	22.2	Burial 2-B-9	194	348194
d	10 15/16	27.8	9 9/16	24.3	Burial 2	32	348182
e	7 15/16	20.1	6 1/16	15.4	Burial 2-B-12	180	348386
f	9 3/16	23.3	7 3/16	18.2	Burial D-1	231	348503
g	5 15/16	15.1	3 13/16	9.7	A-4-B	95	348268
h	7 9/16	19.2	6	15.24	Burial C-2	254	348449
i	3¾	9.5	3 3/16	8.1	A-2-G	59	348216
j	7⅝	19.5	6⅛	15.5	Burial C-8	209	348464
Fig. 19, a	3¼	8.3	6¾	17.2	Burial C-1	181	348444
b	3⅝	9.2	6 5/16	16.0	Burial C-2	252	348447
c	3	7.7	7½	19.0	A-2-I	62	348221
d	5½	14.0	3	7.6			(1)
e	9¾	24.8	5½	14.0	Burial 12	155	348201
f	1 3/16	3.0	2⅞	7.3	Refuse	251	348505
g	1⅝	4.2	2½	6.4			(1)
h	2¾	7.0	4⅛	10.5	Burial C-10	240	348490
i	2⅛	5.3	3 7/16	8.7	do	241	348491
j	9	22.8	10	25.4			(1)
k	5	12.7	4½	11.4			(1)
l	3⅞	9.8	4 5/16	10.9	B-1-E	A-21	348413
m	5⅛	13.0	2 3/16	5.5	A-5-E	104	348315
n	9⅞	25.1	3⅜	8.6	Burial 1	21	348170
			4⅛	10.5			
o	5¼	13.3	4⅛	10.5	A-1-B	47	348205
p	6 9/16	16.7	3 13/16	9.7			
			4 7/16	11.3	Burial 2-B-10	206	348382
q	8¼	21.0	6½	16.5			(1)
Fig. 20, a	3½	8.8	6½	16.5	Burial 2-B-2	179	348370
b	3¾	9.5	8	20.3	A-2-I	63	348222

[1] Denver Museum.

TABLE 2.—NUMBER, SIZE, AND PROVENIENCE OF OBJECTS ILLUSTRATED—Continued

POTTERY—Continued

Illustration	Size				Provenience	Field No.	National Museum No.
	Height		Diameter				
	Inches	Centimeters	Inches	Centimeters			
Fig. 21, a	3½	8.8	6¼	15.9	Refuse mound	175	348356
b	3½	8.8	7⅜	18.7	Burial C-8	214	348470
Fig. 22, a	3¾	9.5	7	17.8	A-2-I	73-A	348226
b	2⅝	6.6	5⅛	13.0	Refuse mound	195-A	348361
Fig. 23, a	3¾	9.5	8	20.3	A-3-B	90	348254
b	3¾	9.5	8½	21.6	A-2-I	68	348225
Fig. 24, a	3¾	9.5	7¾	19.8	Burial 1	22	348171
b	3¼	8.3	7	17.8	Refuse mound	197	348365
Fig. 25, a	--------	--------	--------	--------	Restored from potsherds.	--------	
b	4½	11.4	9½	24.1	Burial 2-B-10	207	348383
Fig. 26, a	4	10.2	8	20.3	Burial 2-B-5	170	348373
b	2¾	7.0	5	12.7	B-1-L	A-18	348418
Fig. 27, a	--------	--------	--------	--------	Restored from potsherds.	--------	
b	3¼	8.3	7¼	18.5	O-Burial 1	O-1a	348511
Fig. 28, a	4	10.2	8½	21.6	Burial C-10	230	348483
b	3½	8.8	8	20.3	Burial 1	24	348173
Fig. 29, a	3¾	9.5	8	20.3	Burial A-1	117	348334
b	3¾	9.5	8	20.3	Burial C-5	248	348451
Fig. 30, a	3½	8.8	8½	21.6	A-2-J	73	348242
b	3½	8.8	7½	19.0	Burial 3	35	348186
Fig. 31, a	4½	11.4	9	22.9	Burial 12	144	348192
b	4½	11.4	9½	24.1	A-3-C	88	348259
Fig. 32, a	3	7.6	5½	14.0	Burial C-5	249	348452
b	3¾	9.5	8	20.3	Burial 1	15	348164
Fig. 33, a	2¾	7.0	6¾	17.2	O-Burial-1	O-1-B	348512
b	--------	--------	--------	--------	Restored from potsherds.	--------	
Fig. 34, a	9	22.9	12½	31.7	A-5-E	101	348312
b	--------	--------	--------	--------	Restored from potsherds.	--------	
Fig. 35, a	3	7.6	7½	19.0	B-1-M	A-20	348421
b	2¾	7.0	7½	19.0	do	A-19a	348420
c	3¾	9.5	7½	19.0	Burial 4	38	348189
d	3¾	9.5	8½	21.6	A-4-A	272	348276
Fig. 36, a	8¼	21.0	11⅝	29.5	A-2-J	70	348240
b	7 3/16	18.3	11⅝	29.5	do	78	348245
c	9 3/16	23.4	12¼	31.1	A-4-A	270	348273
d	8½	21.6	12½	31.7	B-1-A	A-9	348398
Fig. 37, a	10	25.4	8 9/16	21.8	A-4-A	271	348274
b	8 15/16	22.7	4 9/16	19.2	Burial 1	11	348160
Fig. 38, a	3¼	8.3	7½	19.0	Burial D-1	225	348501
b	3¼	8.3	8	20.3	Burial C-8	213	348469
Fig. 39, a	9⅞	25.1	3⅜ 4⅛	8.6 10.5	Burial 1	21	348170
Plate 13, a	15¼	38.7	12 7/16	31.6	A-2-J	80	348246
Plate 14, a	4⅝	11.8	4 1/16	10.3	A-5-E	102	348313
b	4⅝	11.8	4¼	10.8	Burial A-1	114	348331
c	5 13/16	14.8	5¾	14.6	A-5-E	112	348318
d	5½	14.0	3 13/16	9.7	A-2-G	56	348215
Plate 15, a	4 15/16	12.6	5⅛	13.0	Burial A-1	116	348333
b	4¾	12.1	4⅝	11.7	Burial 3	34	348185
c	6¼	15.9	5 15/16	15.1	O-Burial 2	261	348509
d	6 5/16	16.0	5 7/16	13.8	Burial C-7	245	348463

TABLE 2.—NUMBER, SIZE, AND PROVENIENCE OF OBJECTS ILLUSTRATED—Continued

POTTERY—Continued

Illustration	Size				Provenience	Field No.	National Museum No.
	Height		Diameter				
	Inches	Centimeters	Inches	Centimeters			
Plate 16, a	9 5/16	23.8	14⅜	36.5	A-2-J	75	348243
b	9 3/16	23.4	15	38.0	B-1-A	A-8	348397
Plate 17	20½	52.1	14¼	36.2	A-1-B	50	348206
Plate 18, a	17⅜	44.2	12 1/16	30.7	A-2-I	82	348232
b	15¾	40.0	13⅜	34.0	A-5-E	100	348311
Plate 19, a	10 9/16	26.8	8 9/16	21.7	A-4-A	262	348272
b	15 9/16	39.5	13⅞	35.3	A-2-I	79	348230
Plate 20, a	5⅛	13.1	7⅝	19.3	Burial C-1	183	348446
b	5⅜	13.7	7 1/16	18.0	Burial C-8	215	348471
c	8¼	21.0	11⅝	29.5	A-2-J	70	348240
d	7 3/16	18.3	11⅝	29.5	do	78	348245
e	5⅞	15.0	9 1/16	23.0	Burial 3	36	348187
f	6¾	17.2	9¾	24.7	A-5-E	96	348309
g	3 5/16	8.4	6 11/16	16.9	do	119	348320
h	4⅜	11.1	5 5/16	15.1	do	120	348321
Plate 21, a	7⅛	18.1	11	27.9	Burial C-10	255	348450
b	8 1/16	20.5	7 3/16	18.3	Burial 1	2	348151
Plate 22, a	7 11/16	19.5	6⅛	15.5	Burial C-8	209	348464
b	6 9/16	16.7	5 13/16	14.8	Burial 2-B-9	164	348380
c	7 15/16	20.1	6 1/16	15.4	Burial 2-B-12	180	348386
d	9 3/16	23.3	7 3/16	18.2	Burial D-1	231	348503
e	9⅝	23.5	8¾	22.2	Burial 2-B-9	194	348381
f	12 1/16	30.6	9 7/16	24.0	B-1-A	A-2	348394
g	10 15/16	27.8	9 9/16	24.3	Burial 2	32	348182
Plate 23, a	3¾	9.5	3 3/16	8.0	A-2-G	59	348216
b	5⅛	13.0	4 7/16	11.3	Burial C-6	219	348453
c	4 13/16	12.3	4 5/16	11.0	Burial 4	37	348188
d	5 15/16	15.1	3 13/16	9.7	A-4-A	95	348268
Plate 24, a	4⅛	10.5	7⅛	18.1	Burial C-8	212	348465
b	5¾	14.6	10 11/16	27.3	Bracelet burial	140	348349
Plate 25, a	3 5/16	8.4	6⅞	17.4	Burial C-1	181	348444
b	3 5/16	8.4	6¾	17.1	Refuse mound	175	348356
c	2¾	7.0	6¾	17.1	B-1-Burial 1	A-24	348436
d	2 13/16	7.1	6½	16.5	O-Burial 1	O-1c	348513
e	3⅝	9.2	7¾	19.7	Burial 2-B-12	178	348385
f	3½	8.9	7 15/16	20.2	Burial C-12	216	348495
Plate 26, a	3¼	8.2	7 3/16	18.3	O-Burial 1	O-1a	348511
b	2½	6.5	5⅜	13.7	Burial 1	13	348162
c	3¾	9.5	8	20.3	Burial A-1	117	348334
d	3 7/16	8.7	8⅝	22.0	A-2-J	73	348242
e	3 7/16	8.7	8⅜	21.2	Burial 1	24	348173
f	3⅝	9.3	8¾	22.3	A-2-I	68	348225
Plate 27, a	3 1/16	7.8	6 5/16	16.0	Burial B-7	173	348377
b	3⅜	8.6	6¾	17.1	Burial A-2	118	348336
c	4 5/16	11.0	7 11/16	19.5	Burial 2-B-4	192	348371
d	3¾	9.5	8	20.3	Burial C-9	211	348473
e	4⅛	10.6	7 11/16	19.5	Burial 2-B-4	163	348353
f	3 5/16	8.4	6¾	17.1	Burial B-7	174	348378
Plate 28, a	3¼	8.2	7 9/16	19.2	Burial C-10	227	348480
b	3 5/16	8.5	7 13/16	19.8	Burial C-15	217	348499
c	3⅝	9.3	6 5/16	16.0	Burial C-2	252	348447
d	3⅛	8.0	7 3/16	18.3	Burial 12	151	348198
e	3⅝	9.3	9 3/16	23.3	Burial A-4	259	348343
f	3 5/16	8.5	7½	19.1	Burial C-1	182	348445

TABLE 2.—NUMBER, SIZE, AND PROVENIENCE OF OBJECTS ILLUSTRATED—Continued

POTTERY—Continued

Illustration	Size				Provenience	Field No.	National Museum No.
	Height		Diameter				
	Inches	Centimeters	Inches	Centimeters			
Plate 29, a	3 7/16	8.8	7¾	19.8	Bracelet burial	143	348352
b	3¼	8.2	7⅛	18.2	Refuse mound	197	348365
c	4	10.2	9 3/16	23.3	A-5-E	106	348317
d	3⅝	9.3	8⅜	21.3	Burial 2	31	348181
e	3 9/16	9.1	8¾	22.3	Burial 1	23	348172
f	3 15/16	10.0	9	22.9	A-5-E	130	348323
Plate 30, a	2⅞	7.4	6 1/16	15.4	Burial A-3	126	348341
b	2 11/16 2⅛	6.8 5.5	5 9/16	14.1	Burial 12	155	348201
c	3⅝	9.3	7½	19.1	Burial 2-B-15	189	348368
d	3 11/16	9.4	7 3/16	18.3	Burial 2-B-7	172	348376
e	3	7.7	7 7/16	19.0	A-2-I	62	348221
f	3¼	8.2	8	20.3	Burial 1	10	348159
Plate 31, a	3¾	9.5	8	20.3	Burial A-1	117	348334
b	2⅞	7.4	6 1/16	15.4	Burial A-3	126	348341
c	2 13/16	7.1	6½	16.5	O-Burial 1	O-1c	348513
Plate 32, a	2⅛	5.3	3 7/16	8.7	Burial C-10	241	348491
b	3⅞	9.8	4 5/16	10.9	B-1-E	A-21	348413
c	2¾	7.0	4⅛	10.4	Burial C-10	240	348490
Plate 33, a	5¼	13.3	4⅛	10.5	A-1-B	47	348205
b	9⅞	25.1	3⅜ 4⅛	8.6 10.5	Burial 1	21	348170
c	6⅝	16.8	4⅜	11.1	A-5-E	103	348314
d	6 9/16	16.7	3 13/16	9.7	Burial 2-B-10	206	348382
Plate 34, a	3 15/16	10.0	2⅝	6.7	A-2-J	57	348236
b	4 3/16	10.6	2 11/16	6.9	do	86	348247
c	3⅝	9.3	3 1/16	7.8	Burial C-10	243	348493
d	4	10.2	3 7/16	8.7	do	238	348488
Plate 35, a	1 15/16	4.9	1 15/16	4.9	Burial 2-B-14	187	348389
b	1⅝	4.1	1½	3.9	A-4-B	139	348345
c	1⅝	4.1	2¼	5.8	A-4-A	94	348267
d	1½	3.9	2 3/16	5.7	Burial 12	147	348194
e	½	1.4	1 1/16	2.6	B-1-Burial 3	A-25	348437
f	1¼	3.3	1⅝	4.1	Burial 12	195c	348363
Plate 36					Houses C-1 and C-2	298	348439
	Length						
Plate 37, a	3⅛	8.0	1½	3.9	Burial C-6	224	348458
b	1⅞	4.8	⅞	2.3	Burial A-1	117a	348335
c	1⅞	4.8	13/16	2.1	Burial 2-B-14	186	348388
d	2⅛	5.4	⅞	2.3	B-Refuse mound	A-28	348434
e	1 15/16	5.0	⅞	2.3	Burial C-6	224b	348460
f	2	5.1	13/16	2.1	O-Burial 1	257	348507
g	2⅜	6.1	1 1/16	2.7	Burial C-8	212a	348466
h	3 13/16	9.7	1 1/16	2.7	A-3-B	161	348256
i	1⅞	4.8	15/16	2.4	B Village	A-15	348409
Plate 38, a					A-4-B	137	348302
b					A-2-G	54	348234
c					A-2-J	54	348234
d					do	A-13	348402
e					do	54	348234
f					do	54	348234
g					do	54	348234

TABLE 3.—NUMBER, SIZE, AND PROVENIENCE OF OBJECTS ILLUSTRATED

BONE

Plate No.	Size				Provenience	Field No.	National Museum No.
	Length		Average thickness				
	Inches	Centimeters	Inches	Centimeters			
Plate 39, a	5⅛	13.0	11/16	1.8	Refuse mound A–1	44a	348203
b	6 3/16	15.8	9/16	1.5	do	44b	348203
c	4⅛	10.5	¾	1.9	do	44c	348203
d	5⅛	13.0	9/16	1.5	B–1 refuse mound	A–26	348432
e	2 5/16	5.9	9/16	1.5	Refuse mound A–1	1a	348203
f	2⅜	6.1	13/16	2.1	Burial C–6	223	348457
g	4⅝	11.8	⅝	1.6	Refuse mound A–1	44d	348203
h	4⅞	12.4	½	1.3	B–1–C	A–15	348406
i	4⅝	11.8	⅝	1.6	do	A–15b	348408
j	4¾	12.1	⅝	1.6	Refuse mound A–1	44e	348203
k	5⅛	13.0	11/16	1.8	Burial C–6	223b	348457
l	4 11/16	12.0	7/16	1.2	Refuse mound	285	348426
m	3 1/16	7.8	¾	1.9	B–1 refuse mound	A–26	348432
n	2 7/16	6.2	9/16	1.5	do	A–26	348432
Plate 40, a	3 7/16	8.8	⅞	2.3	B–1 burial 1	A–24	348432
b	6 3/16	15.8	11/16	1.8	Refuse mound A–1	44	348203
c	4	10.2	11/16	1.8	Refuse mound C	233	348442
d	3 5/16	8.4	⅝	1.6	Burial C–6	223	348457
e	4⅜	11.1	9/16	1.5	Burial 2	32a	348183
f	2 11/16	6.9	⅞	2.3	Refuse	284a	348424
g	4 1/16	10.3	⅝	1.6	B–1 refuse mound	A–26	348432
h	2⅝	6.7	¾	1.9	Refuse	284b	348425
i	4½	11.5	11/16	1.8	Refuse mound A–1	44	348203
Plate 41, a	6½	16.5	1¾	4.5	Refuse	286	348426
b	7 7/16	18.9	15/16	2.4	Burial C–7	244	348461
c	7¾	19.8	⅝	1.6	Burial C–2	253	348448
d	6½	16.5	7/16	1.5	Refuse	287	348426
e	8¼	21.0	1½	3.9	Refuse mound A–1	44	348203
Plate 42, a	2¾	6.1	¾	2.0	Refuse	288	348427
b	2½	6.4	13/16	2.1	Burial 3	33	348184
c	2 7/16	6.2	11/16	1.8	Refuse	289	348427
d	3¾	9.5	1 5/16	3.4	B–1 refuse mound	A–27	348433
e	2 3/16	5.6	⅝	1.6	Burial 2	32a	348183
f	2¼	5.8	1	2.6	Refuse	290	348427
Plate 43, a	5⅝	14.3	⅜	1.0	B–1 refuse mound	291	348428
b	4⅝	11.8	½	1.3	do	A–29	348435
c	1	2.6	⅜	1.0	do	292	348429
d	1¼	3.2	7/16	1.2	do	244a	348462
e	1 13/16	4.6	9/16	1.5	Burial C–7	293	348429
f	1⅜	3.5	½	1.3	Refuse mound 4	158	348347
g	1 3/16	3.1	7/16	1.2	A–2–I	51	348220
h	⅞	2.3	⅜	1.0	Burial C–8	212	348467
i	¾	1.9	5/16	0.8	do	212	348467

TABLE 3.—NUMBER, SIZE, AND PROVENIENCE OF OBJECTS ILLUSTRATED—Continued

STONE

Plate No.	Size						Provenience	Field No.	National Museum No.
	Length		Breadth		Thickness				
	Inches	Centimeters	Inches	Centimeters	Inches	Centimeters			
Plate 45, a	7 1/16	17.9	5⅝	14.3	3 5/16	10.0	A-2-G	61	348217
b	7 9/16	19.2	5 11/16	14.5	3⅝	9.2	B-1-E	280	348412
c	2 7/16	6.2	1 9/16	4.1	1⅜	3.5	B-1-Kiva	A-23	348423
d	6¼	16.0	4	10.2	3	7.6	A-3-C	85	348258
e	5⅜	13.7	3¼	8.3	2 13/16	7.2	A-2-J	53	348233
Plate 46, a	8 3/16	20.8	4¼	11.4	2¼	5.7	A-1-D	42	348211
b	7⅝	19.3	5	12.7	1 13/16	4.6	A-4-B	278	348303
c	10 1/16	25.5	3 15/16	10.1	2¼	5.7	A-3-B	84	348252
d	8	20.3	4 13/16	12.3	1⅝	4.1	B-1-D	279	348410
Plate 47, a	5⅝	14.3	2⅞	7.4	1⅜	3.5	B-1-C	277	348403
b	6 3/16	15.7	3 11/16	9.4	1½	3.8	B-1-G	276	348414
c	7 13/16	19.8	4⅜	11.1	1½	3.8	C-1-A	275	348438
d	5¾	14.7	3 5/16	8.4	1⅝	4.1	C-2-B	198	348367
Plate 48, a	10¼	26.0	4	10.2	1⅜	3.5	A-6-C	281	348329
b	17 11/16	45.0	2⅛	5.3	1 5/16	3.4	Refuse mound	167	348355
Plate 49, a	[1] 5¼	13.4					A-1-C	43	348207
b	8 3/16	20.9					do	43	348207
c	7 6/16	18.8					Burial 2	283	348510
d	7⅜	18.7					B-1-H	282	348415

[1] Diameters only in this group.

TABLE 4.—SIZE, NUMBER, AND PROVENIENCE OF OBJECTS ILLUSTRATED

CHIPPED IMPLEMENTS AND ORNAMENTS

Illustration	Size				Provenience	Field No.	National Museum No.
	Length		Breadth				
	Inches	Centimeters	Inches	Centimeters			
Plate 50, a	3	7.7	1 5/16	3.4	A-2-J	76	348250
b	2¼	5.8	1 5/16	3.4	A-2-J	296	348275
c	2 3/16	5.7	1 1/16	2.8	Burial C-8	76	348228
d	2⅝	6.7	1 5/16	3.4	do	212d	348468
e	2⅞	7.4	1⅛	2.9	A-5 refuse	212c	348468
f	1⅝	4.2	1½	3.8	A-4-A	233	348441
Plate 51, a	2 9/16	6.5	½	1.3	Burial 1	1	348150
Plate 52, a	1⅝	4.2	1 1/16	2.4	A refuse mound	297	348348
Plate 53, a	2⅛	5.4	1½	3.9	do	250	348504
b	1⅛	2.9	1 3/16	3.0	A-3-C	295	348262
c	1⅛	2.9	1⅛	2.9	Burial C-8	212b	348467
[1] d	½	1.3	¼	0.6	B-1-C	A-5	348403
e	1⅞	4.8	1 1/16	1.8	Refuse mound	294	348430
f					do	299	348431
Plate 54, [2] a	3 7/16	8.8	3½	8.9	Burial	141	348350
b	3½	8.9	3¼	8.3	do	141	348350
c	3¼	8.3	3⅜	8.7	do	141	348350
d	3 7/16	8.8	3⅜	8.7	do	141	348350

[1] Diameter and thickness of this specimen.

[2] The breadth in these specimens is the diameter through the hinge.

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